Test Report for the Gateway Energy and Coke Company Facility ID 119040ATN HRSG Bypass Vent Stack No. 5

Prepared for:
Gateway Energy and Coke Company
Granite City, Illinois

Prepared by:
AECOM
Oak Ridge, Tennessee

July 2017

SunCoke Energy

Gateway Energy and Coke Company, LLC

2585 Edwardsville Rd
Granite City, IL 62040

July 7, 2017

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Environment and Natural Resources Division
U.S. Department of Justice
Box 7611 Ben Franklin Station
Washington, DC 20044-7611
Re: DOJ No. 90-5-2-1-06944/1

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RE: Consent Decree, *United States, et al. v. Gateway Energy & Coke Company LLC, et al.*
Stack Testing Report for GECC May 2017 Stack Testing
Haverhill Coke Company, LLC Facility (Ohio EPA Facility ID 0773000182)

To Whom It May Concern,

The United States, the State of Illinois, the State of Ohio, Gateway Energy & Coke Company, LLC (GECC), Haverhill Coke Company, LLC (HNCC) and SunCoke Energy, Inc. (SunCoke) are parties to a Consent Decree (CD) lodged in the U.S. District Court for the Southern District of Illinois with an Effective Date of November 7, 2014.

In accordance with Paragraphs 29, 30, and 33 of the CD, HNCC and GECC are required to conduct stack testing during any Scheduled FGD Maintenance that lasts more than 2 days and a report documenting the results of the stack test must be submitted no later than 60 days after conducting the stack test. GECC conducted stack testing pursuant to Paragraphs 29 and 30 on May 3 – 12, 2017, during Scheduled FGD Maintenance. Attached, please find the report documenting the stack test results.

Gateway Energy and Coke Company, LLC

2585 Edwardsville Rd
Granite City, IL 62040

Please contact me at 740-355-9871 or kmbatten@suncoke.com if you have any questions or concerns.

Sincerely,

Katie Batten
Director of Environmental
SunCoke Energy, Inc.

TEST REPORT FOR THE
GATEWAY ENERGY AND COKE COMPANY
FACILITY ID 119040ATN
HRSG BYPASS VENT STACK No. 5

Test Dates: May 3-12, 2017

Prepared for:

Gateway Energy and Coke Company
2585 Edwardsville Road
Granite City, IL 62040

Prepared by:

AECOM Technical Services
105 Mitchell Road, Suite 200
Oak Ridge, Tennessee 37830

July 2017

PROJECT CONTACT INFORMATION

Plant Name and Address

Gateway Energy and Coke Company
2585 Edwardsville Road
Granite City, IL 62040

Source Identification

Facility ID – 119040ATN
Stack Test – Bypass Vent Stack No. 5

Source Contact

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Test Company Name

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TABLE OF CONTENTS

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LIST OF ACRONYMS

CD	Consent Decree
CEM	Continuous Emissions Monitoring
CFR	Code of Federal Regulations
CO_2	Carbon Dioxide
CTM	Conditional Test Method
FGD	Flue Gas Desulfurization
GECC	Gateway Energy & Coke Company
H_2O_2	Hydrogen Peroxide
H_2SO_4	Sulfuric Acid Mist
HCl	Hydrogen Chloride
HNO_3	Nitric Acid
HRSG	Heat Recovery Steam Generator
$KMnO_4$	Potassium Permanganate
NOx	Nitrogen Oxides
O_2	Oxygen
PM	Particulate Matter
PM_{10}	Particulate Matter less than 10 microns diameter
SO_2	Sulfur Dioxide
USEPA	United States Environmental Protection Agency

1. INTRODUCTION/OVERVIEW

Gateway Energy & Coke Company (GECC) operates a 120 oven heat recovery coking facility in Granite City, Illinois. A series of stack tests were performed at GECC on Bypass Vent Stack No. 5 over the period of May 3 through May 12, 2017. These tests were performed to collect information required by a Consent Decree (CD) and by the United States Environmental Protection Agency (USEPA) as part of an information collection request. This report documents the results of a portion of the testing – the tests performed to satisfy the CD.

SunCoke Energy, Inc.; Haverhill North Coke Company; and GECC (collectively, SunCoke) entered into a CD with the United States and the states of Ohio and Illinois to resolve alleged Clean Air Act violations. This CD became effective on November 7, 2014. Paragraph 29 of the CD requires stack testing of one of the bypass vent stacks at GECC during flue gas desulfurization (FGD) system maintenance that is scheduled to last more than 2 days. GECC performed FGD maintenance beginning May 1, 2017, for a period of 28 days and performed the required tests on Bypass Vent Stack No. 5. GECC previously submitted a test protocol to USEPA and Illinois EPA of the FGD on February 27, 2017. Paragraph 33 of the CD requires submission of a report documenting the results of the test by no later than 60 days after the test. This report satisfies that requirement.

Table 1 shows the test results compared to CD limits.

Table 1. Bypass Vent Stack Test Results

Pollutant	CD Limit	Test Result	Comply with CD limit?
Total PM/PM_{10} (filterable plus condensable – pounds/hour)	34.3	12.7	Yes
Lead (pounds/hour)	0.186	0.075	Yes
Mercury (pounds/hour)	NA	0.0023	NA
NO_x (pounds/hour)	NA	13.1	NA
Hydrogen chloride (pounds/hour)	NA	25.2	NA
Sulfuric acid mist (pounds/hour)	NA	19.3	NA

The remainder of this report contains CD requirements (Section 2), test results (Section 3), test methods (Section 4), sample train diagrams (Appendix A), production data (Appendix B), calculations and field data (Appendix C), analytical reports (Appendix D), and calibration information (Appendix E).

2. CONSENT DECREE TEST REQUIREMENTS

The CD requires that a series of tests be performed during periods of FGD maintenance scheduled to last more than 2 days. These tests were performed May 5-6, 2017 and May 8-9, 2017. The measured pollutants were:

- Particulate matter (PM) and particulate matter less than 10 microns diameter (PM_{10})
- Lead
- Mercury
- Hydrogen chloride (HCl)
- Sulfuric acid mist (H_2SO_4)
- Nitrogen oxides (NO_x)

3. STACK TEST RESULTS

The bypass vent stacks at GECC were opened to begin FGD maintenance on May 1, 2017. The stack tests for the CD started May 5, 2017, at approximately 15:00 and were completed on May 9, 2017, at approximately 18:00. Paragraph 19 of the CD requires that emissions be minimized during all bypass venting. This includes restrictions on the maximum average coal charge (an average 42.5 tons/oven for the facility) and the maximum coal sulfur content (allowed up to 1.1%). The coal charge tonnage was near the maximum allowed and the coal sulfur was representative:

- Coal charge during all tests: no more than 42.5 tons per oven on average
- Coal sulfur during tests: 0.86% to 0.88% by weight

The coal charge to each oven is measured by a calibrated weigh bin, which batches each coal charge prior to charging it to the oven. During the test, GECC complied with the CD requirement for emissions minimization, which requires a maximum of 42.5 tons on average charged per oven and a maximum coal sulfur of 1.1%. The date and amount of coal charged to each oven under Bypass Vent Stack No. 5 during the tests are shown in Appendix B. The coal sulfur analysis during the tests is also included in Appendix B.

The 120 ovens at GECC operate on a 48-hour coking cycle. Half the ovens are pushed and charged each day. For example, the 60 odd-numbered ovens are pushed and charged one day and the 60 even-numbered ovens are pushed and charged the next. There are two production runs per day; approximately one-fourth of the ovens are pushed and charged during each production run. Production at GECC occurs from approximately 19:00 in the evening until 04:00 the next morning.

As requested by USEPA, one test run was performed during pushing and charging (conducted during the first pass on the heat recovery steam generator [HRSG] Stack No. 5 ovens). Pushing and charging requires approximately 8 to 9 hours each day. Typically no pushing and charging occurs during the other 15 to 16 hours of the day. The average daily

emissions rates are based on performing one run during pushing and charging and two test runs in the mid to late parts of the production cycle where there is no pushing and charging.

The stack tests for HCl, H_2SO_4, and NO_x were performed on May 5 and 6. One test run was performed during the first production run on May 5. The information for the individual test runs and the average results are presented in Table 2. The stack tests for particulate matter, lead, and mercury were performed on May 8 and 9. One test run was performed during the first production run on May 8. The information for the individual test runs and the average results are presented in Table 3.

Table 2. HRSG Bypass Vent Stack No. 5 Test Results for HCl, H_2SO_4, and NO_x

Information Type	Parameters				Average
All sampling trains	Run No.	**1**	**2**	**3**	
	Date	5/5/2017	5/5/2007	5/6/2007	
	Test During Production?	No	Yes	No	
	Average charge/oven (wet tons coal)		42.2		
	O2 (%)	9.7	7.7	11.7	9.7
	CO2 (%)	7.0	8.5	5.5	7.0
HCl	Run times	15:26-17:05	19:30-21:11	13:22-14:58	
	Sample time (minutes)	72	72	72	72
	Volume sampled (dscf)	44.01	43.79	49.73	45.85
	Moisture content (%Vol.)	10.0	10.1	10.3	10.1
	Stack Gas Temperature (^oF)	1,402	1,517	1,303	1,407
	Stack Velocity (ft/sec.)	52.2	54.1	55.7	54.0
	Gas Flow Rate (ACFM)	199,250	206,413	212,791	206,152
	Gas Flow Rate (SCFM)	55,456	54,103	62,445	57,334
	Gas Flow Rate (DSCFM)	49,898	48,646	56,009	51,518
	Percent Isokinetic	102	104	102	103
H2SO4	Run times	16:50-17:50	19:30-20:30	13:22-14:22	
	Sample time (minutes)	60	60	60	
	Volume sampled (dscf)	18.9	18.7	18.4	18.7
Emissions	HCl concentration (ppm)	88	83	88	86
	HCl mass rate (pounds/hr)	24.9	22.9	27.9	25.2
	H2SO4 concentration (ppm)	32.8	21.9	19.3	24.7
	H2SO4 mass rate (pounds/hr)	25.0	16.3	16.5	19.3
	NOx concentration (ppm)	34.6	49.3	24.0	36.0
	NOx emission rate (pounds/hr)	12.4	17.2	9.7	13.1

Table 3. HRSG Bypass Vent Stack No. 5 Test Results for PM/PM_{10}, Lead, and Mercury

Information Type	Parameters				Average
All sampling trains	Run No.	**1**	**2**	**3**	
	Date	5/8/2017	5/8/2017	5/9/2017	
	Test During Production?	No	Yes	No	
	Average charge/oven (wet tons coal)	42.3			
	O2 (%)	11.7	11.7	11.8	11.7
	CO2 (%)	5.5	5.1	5.1	5.2
PM/PM10	Run times	13:25-17:49	21:25-01:07	14:38-18:01	
	Sample time (minutes)	120	120	120	120
	Volume sampled (dscf)	78.03	79.00	77.44	78.2
	Moisture Content (% Vol.)	8.2	8.7	11.1	9.3
	Percent Isokinetic	100.3	100.4	102.1	101
	Stack Gas Temperature (^oF)	1,291	1,359	1,327	1,325
	Stack Velocity (ft/sec.)	51.5	54.6	53.2	53.1
	Gas Flow Rate (ACFM)	196,515	208,568	202,966	202,683
	Gas Flow Rate (SCFM)	58,564	59,601	58,978	59,048
	Gas Flow Rate (DSCFM)	53,768	54,410	52,414	53,531
Metals	Run times	13:25-17:49	21:25-01:07	14:38-18:01	
	Sample time (minutes)	120	120	120	120
	Volume sampled (dscf)	78.3	73.7	81.5	77.8
	Moisture Content (% Vol.)	10.5	12.3	11.1	11.3
	Percent Isokinetic	102.9	104.3	103.2	104
	Stack Gas Temperature (^oF)	1,275	1,353	1,322	1,317
	Stack Velocity (ft/sec.)	51.2	50.9	55.2	52.4
	Gas Flow Rate (ACFM)	195,344	194,177	210,545	200,022
	Gas Flow Rate (SCFM)	58,738	55,662	61,339	58,580
	Gas Flow Rate (DSCFM)	52,549	48,825	54,538	51,971
Emissions	Concentration total PM/PM10 (gr/dscf)	0.025	0.037	0.021	0.027
	Particulate Mass Rate (pounds/hr)				
	Filterable PM/PM10	3.9	11.1	5.0	6.7
	Total PM/PM10 (filterable plus condensable)	11.4	17.3	9.3	12.7
	Lead concentration (ug/m3)	287	515	368	390
	Lead emission rate (lb/hour)	0.056	0.094	0.075	0.075
	Mercury concentration (ug/m3)	11.2	12.7	12.2	12.0
	Mercury emission rate (lb/hour)	0.0022	0.0023	0.0025	0.0023

4. STACK TEST METHODS

The test methods are listed in Table 4. Each test was based on USEPA reference methods or alternative methods approved by USEPA.

Table 4. Test Methods

Emission Unit	Pollutant	Test Method Reference	Comment
Bypass vent stack No. 5	Traverse point layout	USEPA Method 1	
	Gas flow rate	USEPA Method 2	
	Gas molecular weight	USEPA Method 3A	Measured O_2 and CO_2
	Moisture	USEPA Method 4	
	PM/PM_{10}	USEPA Method 5/202	
	NO_x	USEPA Method 7E	
	H_2SO_4	USEPA Conditional Test Method (CTM)-13	Controlled condensate method
	HCl	USEPA Method 26A	
	Lead and Mercury	USEPA Method 29	

This section contains a brief description of the sampling and analytical procedures for each method that was employed during the test program. Any deviations from the methods are also discussed.

4.1 Sampling Point Determination – USEPA Method 1

The number and location of the sampling or traverse points was determined according to the procedures outlined in USEPA Method 1. The sample location was inspected to ensure USEPA Method 1 criteria are met. All points were at least 1.0 inch from the stack wall, per Method 1. The bypass vent stack required a 24 point traverse for isokinetic sampling, which was spread evenly across two sampling ports.

4.2 Flue Gas Velocity and Volumetric Flow Rate – USEPA Method 2

The flue gas velocity and volumetric flow rate were determined according to the procedures outlined in USEPA Method 2. Velocity measurements were made using S-type Pitot tubes that had been calibrated in a wind tunnel according to USEPA Method 2 criteria.

Differential pressures were measured with a fluid-inclined manometer. Flue gas temperatures were measured with Type K thermocouples equipped with digital readouts.

4.3 Flue Gas Composition – USEPA Method 3A

Flue gas analysis for oxygen (O_2) and carbon dioxide (CO_2) concentrations to determine the flue gas dry molecular weight was performed in accordance with USEPA Method 3A directly utilizing continuous emissions monitors (CEMs) for each gas or by obtaining integrated samples that were then analyzed by CEMs for each gas. The concentrations of O_2 and CO_2 were reported in percent levels.

4.4 Flue Gas Moisture Content – USEPA Method 4

The flue gas moisture content was determined in conjunction with each USEPA Method 5/202, Method 29, and Method 26A sampling trains and according to the sampling and analytical procedures outlined in USEPA Method 4. The impingers were connected in series and contained reagents as described in Section 4.5. The impingers were contained in an ice bath to ensure condensation of the moisture in the flue gas stream. Any moisture that was not condensed in the impingers was captured in the silica gel; therefore, all moisture was weighed and entered into moisture content calculations.

4.5 PM/PM_{10} – USEPA Methods 5/202

The CD requires testing for PM and PM_{10}. PM consists of two components – filterable and condensable. It was not practicable to measure filterable PM_{10} in the GECC bypass vent stacks because the temperature (over 1,600ºF) was outside the range of the equipment typically used for Method 201A (400ºF). Certain modifications to the method may be used to extend the range to 500ºF. The equipment described in Method 201A cannot be used above this temperature without alternate construction techniques and the use of exotic materials (40 CFR 60, Appendix A, Method 201A, 8.6.1). In any event, Method 201A uses an in-stack filter after the cyclone,

which limits the temperature to approximately 1,000ºF. Therefore, PM_{10} emissions were assumed to be the same as PM emissions.

The sampling probe was fitted with a calibrated, S-type Pitot for measuring exhaust gas flow rates and a K-type thermocouple for measuring the gas stream temperature. The absence of cyclonic flow was verified prior to performing the compliance tests.

The filterable PM was measured in accordance with USEPA Reference Method 5. The filterable PM was performed by extracting a sample of the stack exhaust gas stream through a one-piece quartz nozzle and liner encased in an air-cooled probe. The probe was attached to a heated, glass filter holder containing a pre-weighed, glass-fiber filter. The filter heater box was maintained at a temperature of 248°F +25°F as measured by a K-type thermocouple in the filter holder housing.

At the conclusion of each test run, the sample train was recovered by rinsing the sample probe and nozzle three times with acetone into a sample container. The filter was removed from the filter holder and placed into a Petri dish and sealed for transportation. The front half of the glass filter holder and connecting elbow were rinsed with acetone into the probe wash sample container. A sample of the acetone used in the sample recovery was collected and analyzed as a reagent blank. The acetone rinses and filters were analyzed for filterable PM.

The condensable fraction of PM was measured using the procedures described in USEPA Reference Method 202. The impinger train contained a water-jacketed coil condenser between the heated filter outlet and inlet to the first impinger. The water condensed in the coil condenser drops into a knockout impinger. The second impinger is initially empty. The cooled gas then passes through a Teflon filter maintained in the range of 65°F to 85°F. The third impinger initially contains 100 mL of distilled water. The fourth impinger contains approximately 200 grams of indicating silica gel. The third and fourth impingers are placed in an ice bath to maintain the impinger train outlet temperature at ≤65°F.

After testing, the impinger train was moved to the test trailer and connected to a cylinder of pure nitrogen and purged for 60 minutes at a flow rate of 14 liters per minute. The condenser, first two impingers, connecting glassware, and front-half of the Teflon filter holder were rinsed with water for the inorganic sample and with acetone followed by hexane for the organic sample. The Teflon filter, organic and inorganic rinses, and reagent blanks were analyzed for inorganic and organic condensable PM.

4.6 HCl – USEPA Method 26A

The HCl sampling was performed using an USEPA Method 26A sampling train. The train consisted of a quartz liner fitted into an air-cooled sampling probe. This is required because the stack temperature was at least 1,600°F. The probe was connected to a heated, glass filter holder containing a quartz filter. The outlet of the filter holder was connected to a series of ball-joint impingers. The first and second impingers were the Greenburg-Smith type and each contained 100 mL of 0.1N sulfuric acid (H_2SO_4). The third impinger was a modified Greenburg-Smith impinger containing water. The fourth impinger was a modified Greenburg-Smith impinger containing 200 grams of indicating silica gel. Only the impingers that absorb HCl (the H_2SO_4 impingers) were analyzed.

4.7 H_2SO_4 – Conditional Test Method 13 (CTM-13)

Conditional Test Method 13 (CTM-13) method, also known as NCASI Method 8A, was developed as an alternative to USEPA Method 8 for determining H_2SO_4 emissions from Kraft recovery furnaces. It has been observed that the reference method, USEPA Method 8, can be subject to significant interference from sulfur dioxide (SO_2) as well as sulfates if they are present in the PM. This alternative method uses a quartz in-line filter to remove PM from the gas stream prior to capturing H_2SO_4. The use of a controlled condensation technique instead of impingers reduces the potential for positive bias from SO_2. This conditional test method was used because the expected sulfur trioxide concentration was small (less than 20 parts per million), and the alternate test method is likely to be more accurate in this situation.

The CTM-13 sampling train consisted of a quartz tube wrapped in an insulating blanket that was used as the sampling probe. The exit of the probe was connected to a filter holder containing a quartz filter, which was maintained at a temperature of 550°F by means of a cylindrical heating mantle. The outlet of the filter holder was connected to a modified Graham condenser that was constructed with a Type-C glass frit and 200 cm of 5-mm ID glass tubing condenser coil. The outer condenser chamber contained water maintained at a temperature ≤150°F by means of a recirculating water bath. The outlet of the heated coil condenser was connected to a series of glass impingers. The first impinger was a Greenburg-Smith filled with 100 mL of 3% hydrogen peroxide (H_2O_2). The second impinger was a modified Greenburg-Smith also filled with 100 mL of 3% H_2O_2. The third impinger was a Greenburg-Smith filled with 100 mL of distilled water. The fourth impinger was a modified Greenburg-Smith filled with 200 grams of indicating silica gel. The sampling train was connected, by means of an umbilical cord, to the control console. The control console contained the dry gas meter, sampling pump, heat controllers, and sample rate controls.

The CTM-13 sample train was operated by placing the end of the quartz sample tube approximately 3 feet into the vent stack. A gas sample was then extracted from a single sampling point in the stack, at a constant sample rate of 10.0 L/min (±10%), for a 1-hour period. Leak checks were performed at both the beginning and ending of a sample test run.

At the conclusion of the test run, the CTM-13 sample train was removed from the sampling platform and recovered in the test trailer. The sample recovery was performed by rinsing the H_2SO_4 condenser with distilled water. The H_2SO_4 condenser rinse was collected into sample containers. The impingers were discarded since they are designed to collect SO_2, which was not a target pollutant for these tests. The H_2SO_4 sample containers were then sealed at the site for subsequent analysis. The CTM-13 analysis was performed by suppressed ion chromatography.

4.8 $NO_x/O_2/CO_2$ – USEPA Method 7E

During the May 5 and 6 tests, AECOM operated CEMs for NO_x and O_2/CO_2 according to USEPA Methods 7E and 3A, respectively. The CEM analyzers were calibrated before the start of testing. System bias checks were performed before and after each test run. The calibration and bias checks used USEPA protocol gases according to USEPA Method 7E and Method 3A guidelines. The gases were measured continuously, and an electronic data logger recorded 1-minute averages for the test runs.

The CEM sampling was performed by placing a sample probe in the stack to withdraw a continuous gas sample. The gas sample was transported through a heated, Teflon sample line to an electric gas chiller that removed moisture from the gas stream. Exiting the gas chiller, the dried sample gas was distributed to each CEM for subsequent analysis.

4.9 Lead and Mercury – USEPA Method 29

The lead and mercury sampling was performed using an USEPA Method 29 sampling train. The sample train consisted of an integrated quartz nozzle and probe liner fitted into an air-cooled sampling probe. This is required because the stack temperature was at least 1,600°F. The outlet of the probe was connected to a heated, glass filter holder containing a quartz fiber filter. The outlet of the filter holder was connected to a series of ball-joint impingers. The first impinger was a modified Greenburg-Smith containing 100 mL of a 5% nitric acid (HNO_3)/10% H_2O_2 mixture. The second impinger was a Greenburg-Smith containing a 5% HNO_3/10% H_2O_2 mixture. The third impinger was a modified Greenburg-Smith and was initially empty. The fourth and fifth impingers were modified Greenburg-Smith types containing a mixture of 4% potassium permanganate ($KMnO_4$)/10% H_2SO_4. The sixth impinger was a modified Greenburg-Smith containing 200 grams of indicating silica gel. The remainder of the sampling train was identical to the previously described Method 5/202 train.

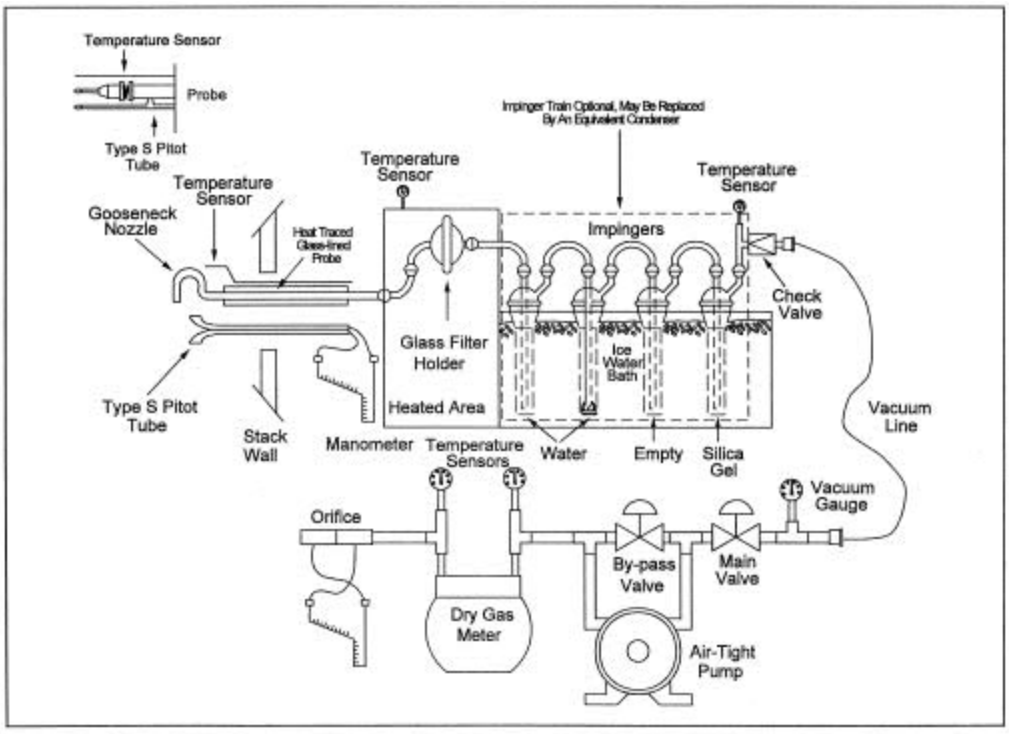
The Method 29 train was operated identically to the Method 5 train, except the total sample volume collected was at least 70 dry standard cubic feet to ensure adequate detection

limits of the target metals. At the conclusion of the sample run, the Method 29 sample train was removed from the stack to the sample recovery trailer for subsequent recovery per Method 29 procedures. The sample probe was washed on the stack to avoid potential breakage of the probe liner.

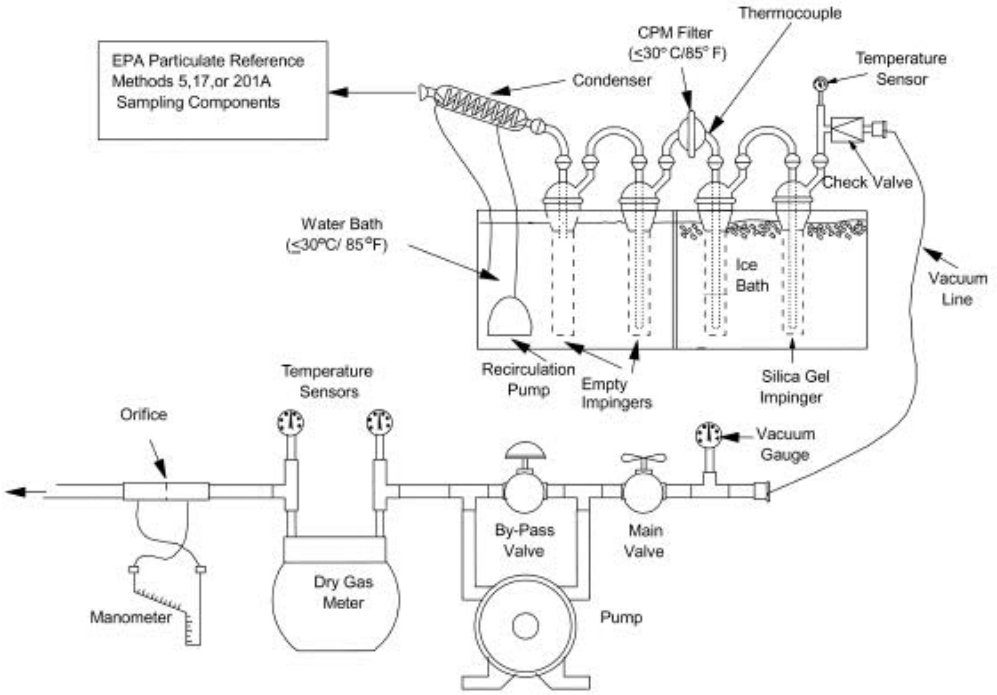
At the conclusion of each Method 29 test run, the sample train was recovered by washing the nozzle/probe assembly and front half of the filter holder three times with 0.1N HNO_3 into a sample container. The impinger train was then disassembled and each impinger weighed to determine the moisture gained during the sample run. The liquid contents of impingers one and two were transferred into a sample container along with the 0.1N HNO_3 rinse. Impinger three was also rinsed with 0.1N HNO_3. The contents of impingers four and five were transferred into a sample container. The impingers were then rinsed with 100 mL of fresh $KMnO_4$ solution. The rinse was transferred to a separate sample container. The impingers were then rinsed with 100 mL of deionized water and added to the same sample container. A 25 mL rinse of 8N HNO_3 was performed and collected into a separate sample container. The silica gel in the last impinger was recovered for subsequent reconditioning.

Samples of the filter, deionized water, impinger solutions, and rinse solutions were collected along with the actual test samples to serve as blanks for the tests. The blank samples were analyzed along with the actual test samples.

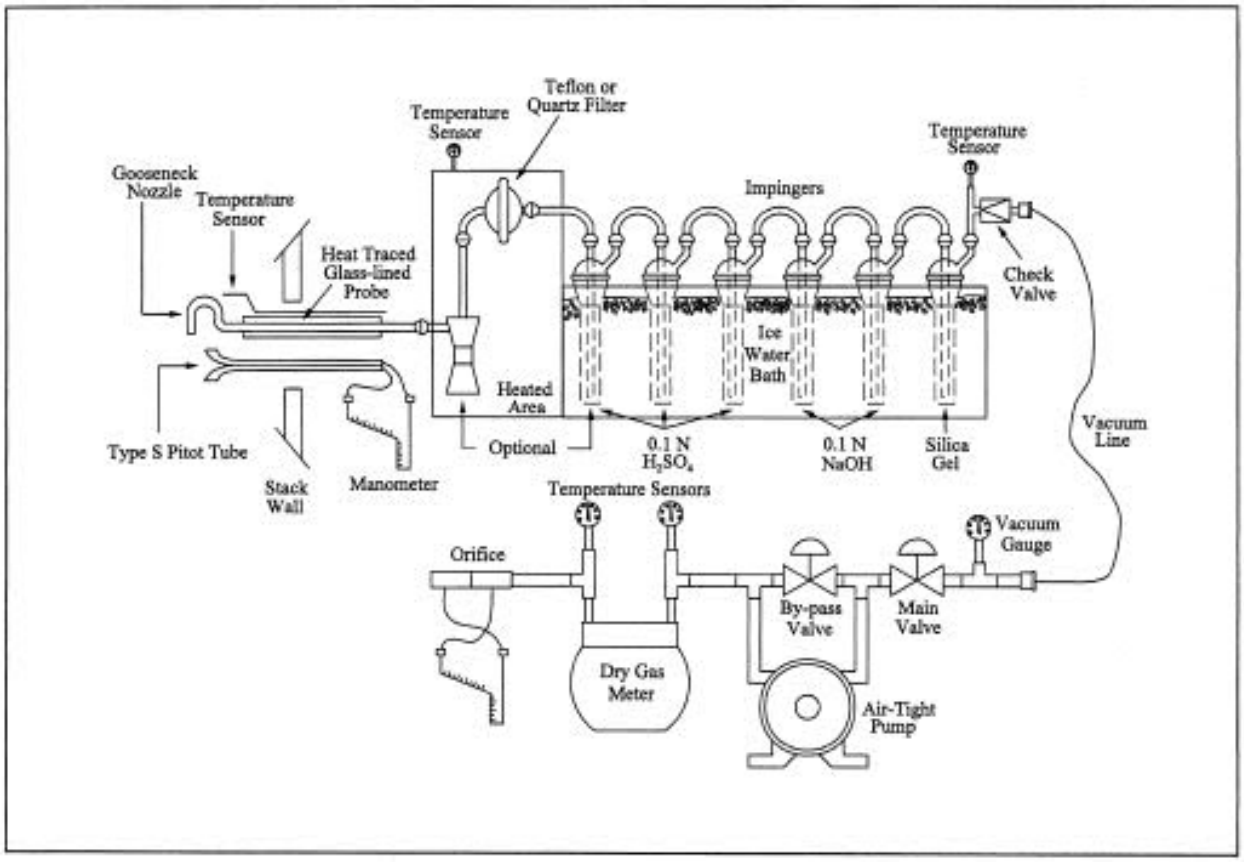
Appendix A
SAMPLE TRAIN DIAGRAMS



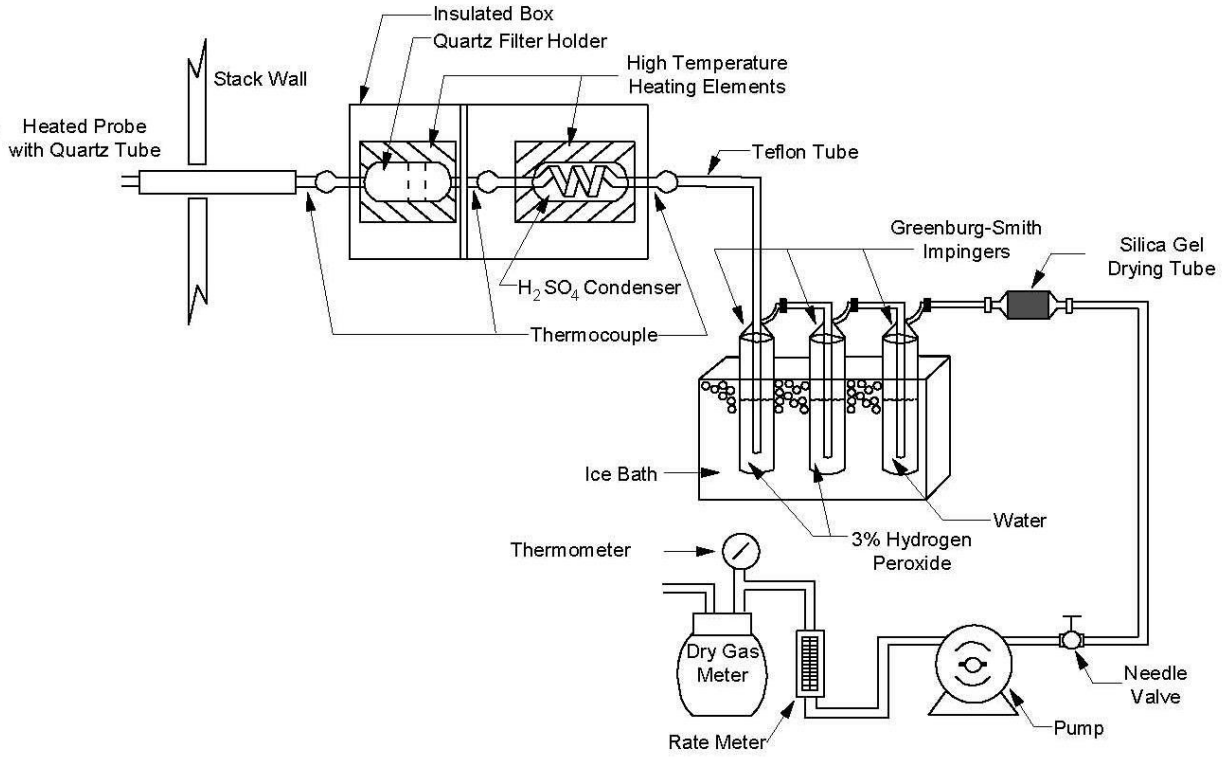
USEPA Method 5 Train (front portion)



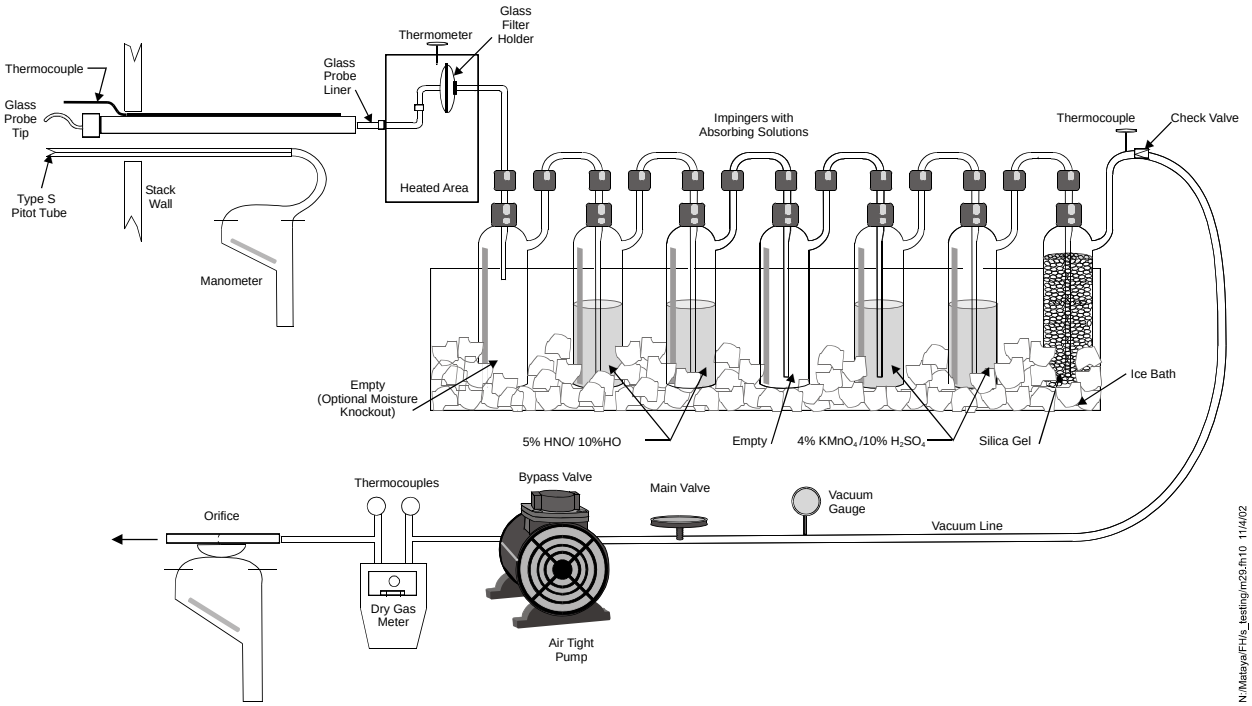
USEPA Method 202 Train (back portion)



USEPA Method 26A Train (no NaOH in back impingers)



USEPA Method CTM-13 Train



USEPA Method 29 Train

Appendix B
PRODUCTION DATA

Coal Charge Tonnage During CD and ICR Tests
Gateway Energy and Coke Company

Oven number	5/2/2017	5/3/2017	5/4/2017	5/5/2017	5/6/2017	5/7/2017	5/8/2017	5/9/2017	5/10/2017	5/11/2017
81	42.68		42.27		42.19		43.11		41.98	
82		41.91		42.54		42.96		42.20		41.20
83		42.00		42.27		42.42		42.17		41.11
84	41.74		42.26		42.25		42.42		42.42	
85	42.61		41.69		42.09		42.68		42.06	
86		42.06		42.09		42.16		41.97		43.38
87		42.20		43.03		42.73		42.10		42.64
88	42.64		41.74		42.48		42.19		42.19	
89	42.38		43.27		42.06		42.41		41.98	
90		42.06		42.22		42.11		42.14		43.67
91		42.10		42.13		42.03		42.14		43.38
92	42.81		42.09		42.20		42.29		42.29	
93	42.58		42.17		42.22		42.03		42.43	
94		42.13		42.29		43.19		42.30		42.73
95		42.03		42.23		42.48		42.19		42.19
96	42.71		42.09		41.72		42.89		42.19	
97	42.65		42.22		42.20		41.74		42.70	
98		41.98		42.29		42.01		41.90		40.60
99		41.91		42.23		42.25		41.95		41.50
100	43.54		42.16		42.07		42.25		41.97	
Average	42.63	42.04	42.20	42.33	42.15	42.43	42.40	42.11	42.22	42.24

Average during HCl, H2SO4, NOx tests 42.2 tons
Average during PM/PM10, lead, mercury tests 42.3 tons

Coal Sulfur During CD and ICR Tests
Coal Composite 042917-050517 0.86%
Coal Composite 050617-051217 0.88%

Appendix C
CALCULATIONS AND FIELD DATA

Calculation Summary

Project Name	**GCO HCL and H2SO4**
Project Number	
Facility	

Sample Type	HCl	HCl	HCl	H2SO4	H2SO4	H2SO4	0	0	A
Source	BVS 5	BVS 5	BVS 5	BVS 5	BVS 5	BVS 5	0	0	
Condition	Non P	Prod	Non P	Non P	Prod	Non P	0	0	
Run	1	2	3	1	2	3	0	0	
Date	5/5/2017	5/5/2007	5/6/2007	5/5/2017	5/5/2017	5/6/2017	1/0/1900	1/0/1900	
Time Start	15:26	19:30	13:22	16:50	19:30	13:22	00:00	00:00	
Time Stop	17:05	21:11	14:58	17:50	20:30	14:22	00:00	00:00	
Sampling Times	15:26-17:05	19:30-21:11	13:22-14:58	16:50-17:50	19:30-20:30	13:22-14:22	00:00-00:00	00:00-00:00	
Duct Diameter (ft) *(equivalent if square duct)*	9.00	9.00	9.00	0.00	0.00	0.00	0.00	0.00	
Pitot Tube Correction Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.00	0.00	
Nozzle Diameter (inches)	0.375	0.375	0.375	NA	NA	NA	0.000	0.000	
DGMCF (Y_d)	0.971	0.971	0.971	0.981	0.981	0.981	0.000	0.000	
Orifice Factor ("wc) ($\Delta H_@$)	2.015	2.015	2.015	NA	NA	NA	0.000	0.000	
Console Identification	URS-001	URS-001	URS-001	URS-005	URS-005	URS-005	0	0	
Standard Temperature (°F)	68	68	68	68	68	68	68	68	
Barometric Pressure Measured ("Hg)	29.84	29.83	29.79	29.84	29.83	29.79	0.00	0.00	
Stack Elevation (ft) (relative to Barometer)	450	450	450	450	450	450	0	0	
Barometric Pressure ("Hg) (P_b)	29.39	29.38	29.34	29.39	29.38	29.34	0	0	
Average Stack Temperature (°F)	1402.0	1516.5	1303.0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1
Average DGM Temp (°F)	96.3	97.0	105.5	98.4	101.4	106.7	#DIV/0!	#DIV/0!	
Average Delta H ("wc) (ΔH_{avg})	1.42	1.38	1.81	0.30	0.30	0.30	#DIV/0!	#DIV/0!	
Condensed Water (g)	103.8	104.0	121.0	0.0	0.0	0.0	0.0	0.0	
Test Duration (minutes) (Θ)	72	72	72	60	60	60	0	0	
Static Pressure ("wc)	-0.31	-0.31	-0.31	NA	NA	NA	0.00	0.00	
Carbon Monoxide (CO) Content (%)	0	0	0	0	0	0	0	0	
Carbon Dioxide (CO_2) Content (%)	7.00	8.50	5.50	7.00	8.50	5.50	0.00	0.00	
Oxygen (O_2) Content (%)	9.70	7.70	11.70	9.70	7.70	11.70	0.00	0.00	
Hydrogen (H_2) Content (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Methane (CH_4) Content (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Nitrogen (N_2) Content (%)	83.30	83.80	82.80	83.30	83.80	82.80	100.00	100.00	
Meter Volume (dcf) (V_m)	48.448	48.282	55.691	20.693	20.678	20.547	0.000	0.000	
Average square root of ΔP ($(\sqrt{\Delta P})_{avg}$)	0.492	0.496	0.538	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
Absolute Stack Pressure ("Hg)	29.37	29.36	29.32	29.39	29.38	29.34	0.00	0.00	
Absolute Stack Temperature (°R)	1862.0	1976.5	1763.0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1
Flue Gas Moisture (%)	10.02	10.08	10.31	0.00	0.00	0.00	#DIV/0!	#DIV/0!	
Moisture at saturation	N/A	N/A	N/A	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
Moisture used in Calculation	10.02	10.08	10.31	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
Gas Molecular Weight (Wet) (g/g-mole)	28.35	28.49	28.18	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
Corrected Vol of Gas Sample (dcf) ($V_{m(actual)}$)	47.043	46.882	54.076	20.300	20.285	20.157	0.000	0.000	
Volume at Meter (dscf)	44.015	43.790	49.732	18.868	18.747	18.431	#DIV/0!	#DIV/0!	
Average Gas Velocity (ft/sec)	52.20	54.08	55.75	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
Avg Flow Rate (acfh)	11,955,022	12,384,782	12,767,483	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	12
Avg Flow Rate (acfm)	199,250	206,413	212,791	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	2
Avg Flow Rate (scfh)	3,327,331	3,246,156	3,746,691	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	3,
Avg Flow Rate (scfm)	55,456	54,103	62,445	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	!
Avg Flow Rate (dscfh)	2,993,893	2,918,782	3,360,552	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	3,
Avg Flow Rate (dscfm)	49,898	48,646	56,009	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	!
Isokinetic Sampling Rate (%)	101.62	103.70	102.29	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	

Calculation Summary

Data Entry Area

Sample Type	HCl	Pitot Tube Correction Factor	0.83	Entered By (initials)	*JC*
Source	BVS 5	Console ID	URS-001	Checked by (initials)	*SB*
Condition	Non P	DGMCF	0.971	Corrected by (initials)	
Run	1	$\Delta H_@$	2.015		
Date	5-May	Nozzle Diameter (in)	0.3750	% CO	0
Duct Diameter (ft)	9	Std Temp (°F)	68	% CO_2	7
Duct Depth (ft)		Bar Press ("Hg, meas)	29.84	% O_2	9.7
Duct Width (ft)		Meter Elev (ft) (rel to Brmtr)	450	% H_2	0
		Static Press ("H_2O)	-0.31	% CH_4	0

Times		DGM Volumes (as read)	
start	15:26	start	811.706
stop	16:02	stop	836.497
start	16:29	start	836.538
stop	17:05	stop	860.195
start		start	
stop		stop	
start		start	
stop		stop	
start		start	
stop		stop	
start		start	
stop		stop	
start		start	
stop		stop	
start		start	
stop		stop	
start		start	
stop		stop	
Duration	72	Total	48.448

Impinger Catch (g)			
	Initial	Final	
1	716.5	804.5	88
2	625.3	629.9	4.6
3	631.7	633.8	2.1
4	928.1	937.2	9.1
5			
6			
7			
8			
9			
10			
		Total Wt Gain	103.8

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	√ΔP	√ΔH
Averages	0.24	1.42	1402	96.3	0.4920	1.1860
Individual Readings	0.2800	1.70	1469	93	0.52915026	1.30384
	0.2800	1.60	1468	94	0.52915026	1.264911
	0.2800	1.60	1463	94	0.52915026	1.264911
	0.2600	1.50	1464	96	0.50990195	1.224745
	0.2900	1.60	1458	97	0.53851648	1.264911
	0.2700	1.60	1450	97	0.51961524	1.264911
	0.2500	1.40	1420	98	0.5	1.183216
	0.2800	1.60	1401	99	0.52915026	1.264911
	0.2800	1.60	1410	99	0.52915026	1.264911
	0.2400	1.40	1395	100	0.48989795	1.183216
	0.2100	1.20	1383	100	0.45825757	1.095445
	0.1500	0.90	1274	100	0.38729833	0.948683
	0.2300	1.40	1397	93	0.47958315	1.183216
	0.2400	1.40	1423	94	0.48989795	1.183216
	0.2200	1.30	1424	94	0.46904158	1.140175
	0.2300	1.30	1413	94	0.47958315	1.140175
	0.2300	1.30	1415	94	0.47958315	1.140175
	0.2800	1.60	1412	95	0.52915026	1.264911
	0.2800	1.60	1385	95	0.52915026	1.264911
	0.2600	1.50	1362	97	0.50990195	1.224745
	0.2500	1.50	1366	97	0.5	1.224745
	0.2300	1.40	1361	97	0.47958315	1.183216
	0.1600	0.97	1318	97	0.4	0.984886
	0.1700	1.00	1318	97	0.41231056	1

Calculation Summary

Data Entry Area

Sample Type	HCl	Pitot Tube Correction Factor	0.83	Entered By (initials)	JC
Source	BVS 5	Console ID	URS-001	Checked by (initials)	SB
Condition	Prod	DGMCF	0.971	Corrected by (initials)	
Run	2	$\Delta H_@$	2.015		
Date	5-May	Nozzle Diameter (in)	0.3750	% CO	0
Duct Diameter (ft)	9	Std Temp (°F)	68	% CO_2	8.5
Duct Depth (ft)		Bar Press ("Hg, meas)	29.83	% O_2	7.7
Duct Width (ft)		Meter Elev (ft) (rel to Brmtr)	450	% H_2	0
		Static Press ("H_2O)	-0.31	% CH_4	0

Times		DGM Volumes (as read)		Impinger Catch (g)			
					Initial	Final	
start	19:30	start	860.517	1	761.3	850.7	89.4
stop	20:06	stop	883.744	2	776.8	781.1	4.3
start	20:35	start	884.002	3	651.2	652.9	1.7
stop	21:11	stop	909.057	4	870.4	879.0	8.6
start		start		5			
stop		stop		6			
start		start		7			
stop		stop		8			
start		start		9			
stop		stop		10			
start		start					
stop		stop					
start		start					
stop		stop					
start		start					
stop		stop					
start		start					
stop		stop					
						Total Wt Gain	104.0
Duration	72	Total	48.282				

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	√ΔP	√ΔH
Averages	0.25	1.38	1517	97.0	0.4958	1.1689
Individual Readings	0.1700	1.00	1374	97	0.41231056	1
	0.1800	1.10	1387	97	0.42426407	1.04881
	0.1900	1.10	1403	97	0.43588989	1.04881
	0.2000	1.20	1422	98	0.4472136	1.09545
	0.2400	1.40	1455	98	0.48989795	1.18322
	0.2700	1.60	1478	99	0.51961524	1.26491
	0.3100	1.80	1505	100	0.55677644	1.34164
	0.2900	1.60	1509	100	0.53851648	1.26491
	0.2600	1.50	1519	100	0.50990195	1.22474
	0.2500	1.40	1546	101	0.5	1.18322
	0.1800	1.00	1449	101	0.42426407	1
	0.1300	0.75	1400	102	0.36055513	0.86603
	0.3000	1.80	1595	99	0.54772256	1.34164
	0.3000	1.60	1621	97	0.54772256	1.26491
	0.2800	1.50	1619	97	0.52915026	1.22474
	0.2700	1.40	1611	96	0.51961524	1.18322
	0.3100	1.60	1609	95	0.55677644	1.26491
	0.3100	1.60	1600	95	0.55677644	1.26491
	0.2900	1.50	1555	95	0.53851648	1.22474
	0.2800	1.50	1550	94	0.52915026	1.22474
	0.2700	1.50	1551	94	0.51961524	1.22474
	0.2600	1.40	1550	92	0.50990195	1.18322
	0.2500	1.30	1549	92	0.5	1.14018
	0.1800	0.98	1540	92	0.42426407	0.98995

Calculation Summary

Data Entry Area

Sample Type	HCl	Pitot Tube Correction Factor	0.83	Entered By (initials)	JC
Source	BVS 5	Console ID	URS-001	Checked by (initials)	SB
Condition	Non P	DGMCF	0.971	Corrected by (initials)	
Run	3	$\Delta H_@$	2.015		
Date	6-May	Nozzle Diameter (in)	0.3750	% CO	
Duct Diameter (ft)	9	Std Temp (°F)	68	% CO_2	5.5
Duct Depth (ft)		Bar Press ("Hg, meas)	29.79	% O_2	11.7
Duct Width (ft)		Meter Elev (ft) (rel to Brmtr)	450	% H_2	
		Static Press ("H_2O)	-0.31	% CH_4	

Times		DGM Volumes (as read)		Impinger Catch (g)			
					Initial	Final	
start	13:22	start	912.830	1	718.8	823.6	104.8
stop	13:58	stop	941.687	2	626.6	630.0	3.4
start	14:22	start	941.908	3	633.6	635.2	1.6
stop	14:58	stop	968.742	4	923.3	934.5	11.2
start		start		5			
stop		stop		6			
start		start		7			
stop		stop		8			
start		start		9			
stop		stop		10			
start		start					
stop		stop					
start		start					
stop		stop					
start		start					
stop		stop					
start		start					
stop		stop					
						Total Wt Gain	121.0
Duration	72	Total	55.691				

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	√ΔP	√ΔH
Averages	0.29	1.81	1303	105.5	0.5378	1.3361
Individual Readings	0.3000	1.80	1217	100	0.54772256	1.341641
	0.2900	1.90	1045	100	0.53851648	1.378405
	0.2700	1.90	1065	101	0.51961524	1.378405
	0.2900	2.10	1063	101	0.53851648	1.449138
	0.2900	2.10	1311	102	0.53851648	1.449138
	0.3200	2.00	1337	103	0.56568542	1.414214
	0.3600	2.20	1381	103	0.6	1.48324
	0.3800	2.30	1392	104	0.6164414	1.516575
	0.3500	2.00	1398	105	0.59160798	1.414214
	0.4000	2.30	1430	105	0.63245553	1.516575
	0.2900	1.60	1382	106	0.53851648	1.264911
	0.2000	1.10	1350	106	0.4472136	1.048809
	0.2900	1.70	1407	105	0.53851648	1.30384
	0.2800	1.70	1403	105	0.52915026	1.30384
	0.3400	2.00	1407	106	0.58309519	1.414214
	0.3900	2.30	1385	107	0.6244998	1.516575
	0.3000	1.80	1354	107	0.54772256	1.341641
	0.2700	1.60	1306	107	0.51961524	1.264911
	0.3100	1.90	1297	109	0.55677644	1.378405
	0.2900	1.80	1295	109	0.53851648	1.341641
	0.2500	1.60	1295	110	0.5	1.264911
	0.2600	1.60	1287	110	0.50990195	1.264911
	0.1800	1.20	1265	111	0.42426407	1.095445
	0.1300	0.85	1200	111	0.36055513	0.921954

Calculation Summary

Data Entry Area

Sample Type	H2SO4	Pitot Tube Correction Factor	0.83	Entered By (initials)	JC
Source	BVS 5	Console ID	URS-005	Checked by (initials)	SB
Condition	Non P	DGMCF	0.981	Corrected by (initials)	
Run	1	$\Delta H_@$	NA		
Date	5-May	Nozzle Diameter (in)	NA	% CO	
Duct Diameter (ft)		Std Temp (°F)	68	% CO_2	7
Duct Depth (ft)		Bar Press ("Hg, meas)	29.84	% O_2	9.7
Duct Width (ft)		Meter Elev (ft) (rel to Brmtr)	450	% H_2	
		Static Press ("H_2O)	NA	% CH_4	

Times		DGM Volumes (as read)	
start	16:50	start	486.462
stop	17:50	stop	507.155
start		start	
stop		stop	
start		start	
stop		stop	
start		start	
stop		stop	
start		start	
stop		stop	
start		start	
stop		stop	
start		start	
stop		stop	
start		start	
stop		stop	
start		start	
stop		stop	
start		start	
stop		stop	
Duration	60	Total	20.693

Impinger Catch (g)		
	Initial	Final
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
Total Wt Gain		0.0

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	√ΔP	√ΔH
Averages	#DIV/0!	0.30	#DIV/0!	98.4	#DIV/0!	0.5477
Individual Readings		0.30	NA	97		0.5477226
		0.30		97		0.5477226
		0.30		97		0.5477226
		0.30		97		0.5477226
		0.30		98		0.5477226
		0.30		99		0.5477226
		0.30		100		0.5477226
		0.30		99		0.5477226
		0.30		99		0.5477226
		0.30		99		0.5477226
		0.30		99		0.5477226
		0.30		100		0.5477226

Calculation Summary

Data Entry Area

Sample Type	H2SO4	Pitot Tube Correction Factor	0.83	Entered By (initials)	JC
Source	BVS 5	Console ID	URS-005	Checked by (initials)	SB
Condition	Prod	DGMCF	0.981	Corrected by (initials)	
Run	2	$\Delta H_@$	NA		
Date	5-May	Nozzle Diameter (in)	NA	% CO	
Duct Diameter (ft)		Std Temp (°F)	68	% CO_2	8.5
Duct Depth (ft)		Bar Press ("Hg, meas)	29.83	% O_2	7.7
Duct Width (ft)		Meter Elev (ft) (rel to Brmtr)	450	% H_2	
		Static Press ("H_2O)	NA	% CH_4	

Times		DGM Volumes (as read)	
start	19:30	start	507.908
stop	20:30	stop	528.586
start		start	
stop		stop	
start		start	
stop		stop	
start		start	
stop		stop	
start		start	
stop		stop	
start		start	
stop		stop	
start		start	
stop		stop	
start		start	
stop		stop	
start		start	
stop		stop	
start		start	
stop		stop	
Duration	60	Total	20.678

Impinger Catch (g)		
	Initial	Final
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
Total Wt Gain		0.0

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	√ΔP	√ΔH
Averages	#DIV/0!	0.30	#DIV/0!	101.4	#DIV/0!	0.5477

Individual Readings						
		0.30	NA		99	0.54772
		0.30			99	0.54772
		0.30			99	0.54772
		0.30			100	0.54772
		0.30			101	0.54772
		0.30			101	0.54772
		0.30			102	0.54772
		0.30			102	0.54772
		0.30			103	0.54772
		0.30			103	0.54772
		0.30			104	0.54772
		0.30			104	0.54772

Calculation Summary

Data Entry Area

Sample Type	H2SO4	Pitot Tube Correction Factor	0.83	Entered By (initials)	JC
Source	BVS 5	Console ID	URS-005	Checked by (initials)	SB
Condition	Non P	DGMCF	0.981	Corrected by (initials)	
Run	3	$\Delta H_@$	NA		
Date	6-May	Nozzle Diameter (in)	NA	% CO	
Duct Diameter (ft)		Std Temp (°F)	68	% CO_2	5.5
Duct Depth (ft)		Bar Press ("Hg, meas)	29.79	% O_2	11.7
Duct Width (ft)		Meter Elev (ft) (rel to Brmtr)	450	% H_2	
		Static Press ("H_2O)	NA	% CH_4	

Times		DGM Volumes (as read)		Impinger Catch (g)		
					Initial	Final
start	13:22	start	529.305	1		
stop	14:22	stop	549.852	2		
start		start		3		
stop		stop		4		
start		start		5		
stop		stop		6		
start		start		7		
stop		stop		8		
start		start		9		
stop		stop		10		
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
start		start				
stop		stop				
					Total Wt Gain	0.0
Duration	60	Total	20.547			

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	√ΔP	√ΔH
Averages	#DIV/0!	0.30	#DIV/0!	106.7	#DIV/0!	0.5477
Individual Readings		0.30		106		0.54772
		0.30		106		0.54772
		0.30		106		0.54772
		0.30		106		0.54772
		0.30		106		0.54772
		0.30		106		0.54772
		0.30		106		0.54772
		0.30		107		0.54772
		0.30		107		0.54772
		0.30		108		0.54772
		0.30		108		0.54772
		0.30		108		0.54772

HCl Results

Parameter	Run 1	Run 2	Run 3
Sample volume (dscf)	44.01	43.79	49.73
Sample volume (dscm)	1.246	1.240	1.408
HCl in sample (ug)	166,000	156,000	187,000
Conc. (ug/ft3)	3,771	3,562	3,760
Conc. (ug/m3)	133,187	125,807	132,789
Molecular weight	36.5	36.5	36.5
Conc. (ppm)	87.8	82.9	87.5

H2SO4 Results

Parameter	Run 1	Run 2	Run 3
Sample volume (dscf)	18.87	18.75	18.43
Sample volume (dscm)	0.534	0.531	0.522
H2SO4 in sample (ug)	71,500	47,400	41,000
Conc. (ug/ft3)	3789	2528	2225
Conc. (ug/m3)	133822	89287	78558
Molecular weight	98	98	98
Conc. (ppm)	32.8	21.9	19.3

Calculation Summary

Project Name	**GCO PM and Metals**
Project Number	
Facility	

Sample Type	PM	PM	PM	Metals	Metals	Metals	0	0	Averages
Source	BVS 5	BVS 5	BVS 5	BVS 5	BVS 5	BVS 5	0	0	
Condition	Non P	Prod	Non P	Non P	Prod	Non P	0	0	
Run	1	2	3	1	2	3	0	0	
Date	5/8/2017	5/8/2017	5/9/2017	5/8/2017	5/8/2017	5/9/2017	1/0/1900	1/0/1900	
Time Start	13:25	21:25	14:38	13:25	21:25	14:38	00:00	00:00	
Time Stop	17:49	01:07	18:01	17:49	01:07	18:01	00:00	00:00	
Sampling Times	13:25-17:49	21:25-01:07	14:38-18:01	13:25-17:49	21:25-01:07	14:38-18:01	00:00-00:00	00:00-00:00	
Duct Diameter (ft) *(equivalent if square duct)*	9.00	9.00	9.00	9.00	9.00	9.00	0.00	0.00	
Pitot Tube Correction Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.00	0.00	
Nozzle Diameter (inches)	0.375	0.375	0.375	0.375	0.375	0.375	0.000	0.000	
DGMCF (Y_d)	0.971	0.971	0.971	0.981	0.981	0.981	0.000	0.000	
Orifice Factor ("wc) ($\Delta H_@$)	2.015	2.015	2.015	1.947	1.947	1.947	0.000	0.000	
Console Identification	URS-001	URS-001	URS-001	URS-005	URS-005	URS-005	0	0	
Standard Temperature (°F)	68	68	68	68	68	68	68	68	
Barometric Pressure Measured ("Hg)	30.03	29.92	29.89	30.03	29.92	29.89	0.00	0.00	
Stack Elevation (ft) (relative to Barometer)	450	450	450	450	450	450	0	0	
Barometric Pressure ("Hg) (P_b)	29.58	29.47	29.44	29.58	29.47	29.44	0	0	
Average Stack Temperature (°F)	1290.5	1358.8	1326.8	1274.9	1353.1	1322.2	#DIV/0!	#DIV/0!	1321.0
Average DGM Temp (°F)	94.6	79.9	96.8	95.3	78.7	96.2	#DIV/0!	#DIV/0!	
Average Delta H ("wc) (ΔH_{avg})	1.58	1.60	1.61	1.41	1.37	1.51	#DIV/0!	#DIV/0!	
Condensed Water (g)	147.4	159.6	205.4	195.2	218.5	215.1	0.0	0.0	
Test Duration (minutes) (Θ)	120	120	120	120	120	120	0	0	
Static Pressure ("wc)	-0.25	-0.25	-0.25	-0.25	-0.25	0.25	0.00	0.00	
Carbon Monoxide (CO) Content (%)	0	0	0	0	0	0	0	0	
Carbon Dioxide (CO_2) Content (%)	5.50	5.10	5.10	5.50	5.10	5.10	0.00	0.00	
Oxygen (O_2) Content (%)	11.70	11.70	11.80	11.70	11.70	11.80	0.00	0.00	
Hydrogen (H_2) Content (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Methane (CH_4) Content (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Nitrogen (N_2) Content (%)	82.80	83.20	83.10	82.80	83.20	83.10	100.00	100.00	
Meter Volume (dcf) (V_m)	85.048	84.121	85.129	84.566	77.550	88.574	0.000	0.000	
Average square root of ΔP ($(\sqrt{\Delta P})_{avg}$)	0.503	0.521	0.509	0.500	0.483	0.529	#DIV/0!	#DIV/0!	
Absolute Stack Pressure ("Hg)	29.56	29.45	29.42	29.56	29.45	29.42	0.00	0.00	
Absolute Stack Temperature (°R)	1750.5	1818.8	1786.8	1734.9	1813.1	1782.2	#DIV/0!	#DIV/0!	1781.0
Flue Gas Moisture (%)	8.19	8.71	11.13	10.54	12.28	11.09	#DIV/0!	#DIV/0!	10.32
Moisture at saturation	N/A	N/A	N/A	N/A	N/A	N/A	#DIV/0!	#DIV/0!	
Moisture used in Calculation	8.19	8.71	11.13	10.54	12.28	11.09	#DIV/0!	#DIV/0!	10.32
Gas Molecular Weight (Wet) (g/g-mole)	28.42	28.30	28.03	28.15	27.90	28.04	#DIV/0!	#DIV/0!	
Corrected Vol of Gas Sample (dcf) ($V_{m(actual)}$)	82.582	81.681	82.660	82.959	76.077	86.891	0.000	0.000	
Volume at Meter (dscf)	78.035	78.998	77.444	78.265	73.693	81.468	#DIV/0!	#DIV/0!	
Average Gas Velocity (ft/sec)	51.48	54.64	53.17	51.18	50.87	55.16	#DIV/0!	#DIV/0!	52.75
Avg Flow Rate (acfh)	11,790,876	12,514,069	12,177,968	11,720,659	11,650,600	12,632,706	#DIV/0!	#DIV/0!	12,081,147
Avg Flow Rate (acfm)	196,515	208,568	202,966	195,344	194,177	210,545	#DIV/0!	#DIV/0!	201,352
Avg Flow Rate (scfh)	3,513,860	3,576,078	3,538,668	3,524,309	3,339,735	3,680,332	#DIV/0!	#DIV/0!	3,528,830
Avg Flow Rate (scfm)	58,564	59,601	58,978	58,738	55,662	61,339	#DIV/0!	#DIV/0!	58,814
Avg Flow Rate (dscfh)	3,226,077	3,264,600	3,144,856	3,152,937	2,929,529	3,272,304	#DIV/0!	#DIV/0!	3,165,051
Avg Flow Rate (dscfm)	53,768	54,410	52,414	52,549	48,825	54,538	#DIV/0!	#DIV/0!	52,751
Isokinetic Sampling Rate (%)	100.32	100.36	102.13	102.95	104.32	103.25	#DIV/0!	#DIV/0!	

Filter Weight Gain (mg)	34.9	80.4	35.7						
PNR Weight Gain (mg)	8.01	41.8	20.6						
Impinger Residue (mg)	82.4	67.4	47						0.00871
Front-Half Particulate Loading (gr/dscf)	0.00848	0.0239	0.0112	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	0.00971
Back-Half Particulate Loading (gr/dscf)	0.0163	0.0132	0.00936	NA	NA	NA	NA	NA	0.0165
Total Particulate Loading (gr/dscf)	0.0248	0.0370	0.0206	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	19.9
Front-Half Particulate Loading (mg/dscm)	19.4	54.6	25.7	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	29.6
Back-Half Particulate Loading (mg/dscm)	37.3	30.1	21.4	NA	NA	NA	NA	NA	37.7
Total Particulate Loading (mg/dscm)	56.7	84.7	47.1	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	0.0132
Front-Half Particulate Loading O_2 Corr (gr/dscf)	0.0128	0.0361	0.0171	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	0.0196
Back-Half Particulate Loading O_2 Corrected (gr/dscf)	0.0246	0.0199	0.0143	NA	NA	NA	NA	NA	0.0250
Total Particulate Loading O_2 Corrected (gr/dscf)	0.0374	0.0560	0.0314	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	30.2
Front-Half Particulate Loading O_2 Corrected (mg/dscm)	29.3	82.5	39.2	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	44.9
Back-Half Particulate Loading O_2 Corrected (mg/dscm)	56.3	45.5	32.7	NA	NA	NA	NA	NA	57.1
Total Particulate Loading O_2 Corrected (mg/dscm)	85.7	128	71.9	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	4.02
Front-Half Particulate Emission (lbs/hr)	3.91	11.1	5.04	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	7.59
Total Particulate Emission (lbs/hr)	11.4	17.3	9.25	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	

Calculation Summary

Data Entry Area

Sample Type	PM	Pitot Tube Correction Factor	0.83	Entered By (initials)	JC
Source	BVS 5	Console ID	URS-001	Checked by (initials)	SB
Condition	Non P	DGMCF	0.971	Corrected by (initials)	
Run	1	$\Delta H_@$	2.015		
Date	8-May	Nozzle Diameter (in)	0.3750	% CO	
Duct Diameter (ft)	9	Std Temp (°F)	68	% CO_2	5.5
Duct Depth (ft)		Bar Press ("Hg, meas)	30.03	% O_2	11.7
Duct Width (ft)		Meter Elev (ft) (rel to Brmtr)	450	% H_2	
		Static Press ("H_2O)	-0.25	% CH_4	

Times		DGM Volumes (as read)		Impinger Catch (g)			
					Initial	Final	
start	13:25	start	971.208	1	369.3	464.9	95.6
stop	13:28	stop	973.178	2	607.4	616.7	9.3
start	15:10	start	973.884	3	741.8	760.0	18.2
stop	16:07	stop	1016.117	4	829.4	853.7	24.3
start	16:49	start	1016.269	5			
stop	17:49	stop	1057.114	6			
start		start		7			
stop		stop		8			
start		start		9			
stop		stop		10			
start		start					
stop		stop					
start		start					
stop		stop					
start		start					
stop		stop					
start		start					
stop		stop					
						Total Wt Gain	147.4
Duration	120	Total	85.048				

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	√ΔP	√ΔH
Averages	0.26	1.58	1291	94.6	0.5026	1.2460

Individual	0.18	1.00	1125	95	0.42426407	1
Readings	0.21	1.40	1267	84	0.45825757	1.183216
	0.21	1.40	1280	84	0.45825757	1.183216
	0.23	1.40	1281	85	0.47958315	1.183216
	0.25	1.50	1290	85	0.5	1.224745
	0.26	1.60	1292	85	0.50990195	1.264911
	0.29	1.80	1309	85	0.53851648	1.341641
	0.33	2.00	1334	86	0.57445626	1.414214
	0.35	2.10	1346	88	0.59160798	1.449138
	0.34	2.00	1347	89	0.58309519	1.414214
	0.36	2.10	1354	92	0.6	1.449138
	0.38	2.30	1345	95	0.6164414	1.516575
	0.20	1.20	1220	97	0.4472136	1.095445
	0.25	1.60	1247	97	0.5	1.264911
	0.28	1.80	1249	99	0.52915026	1.341641
	0.28	1.80	1262	99	0.52915026	1.341641
	0.28	1.80	1265	101	0.52915026	1.341641
	0.26	1.60	1279	102	0.50990195	1.264911
	0.28	1.70	1319	104	0.52915026	1.30384
	0.25	1.50	1318	104	0.5	1.224745
	0.23	1.40	1327	104	0.47958315	1.183216
	0.20	1.20	1324	104	0.4472136	1.095445
	0.17	1.10	1298	103	0.41231056	1.048809
	0.10	0.60	1294	103	0.31622777	0.774597

Calculation Summary

Data Entry Area

Sample Type	PM	Pitot Tube Correction Factor	0.83	Entered By (initials)	JC
Source	BVS 5	Console ID	URS-001	Checked by (initials)	SB
Condition	Prod	DGMCF	0.971	Corrected by (initials)	
Run	2	$\Delta H_@$	2.015		
Date	8-May	Nozzle Diameter (in)	0.3750	% CO	
Duct Diameter (ft)	9	Std Temp (°F)	68	% CO_2	5.1
Duct Depth (ft)		Bar Press ("Hg, meas)	29.92	% O_2	11.7
Duct Width (ft)		Meter Elev (ft) (rel to Brmtr)	450	% H_2	
		Static Press ("H_2O)	-0.25	% CH_4	

Times		DGM Volumes (as read)		Impinger Catch (g)			
					Initial	Final	
start	21:25	start	58.146	1	356.8	458.0	101.2
stop	22:25	stop	101.122	2	596.4	601.5	5.1
start	24:07	start	102.412	3	695.3	725.0	29.7
stop	01:07	stop	143.557	4	816.8	840.4	23.6
start		start		5			
stop		stop		6			
start		start		7			
stop		stop		8			
start		start		9			
stop		stop		10			
start		start					
stop		stop					
start		start					
stop		stop					
start		start					
stop		stop					
start		start					
stop		stop					
						Total Wt Gain	159.6
Duration	120	Total	84.121				

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	√ΔP	√ΔH
Averages	0.27	1.60	1359	79.9	0.5213	1.2623

Individual Readings	0.23	1.40	1226	79	0.47958315	1.18322
	0.27	1.70	1251	79	0.51961524	1.30384
	0.23	1.40	1238	78	0.47958315	1.18322
	0.26	1.60	1273	78	0.50990195	1.26491
	0.31	1.90	1291	79	0.55677644	1.3784
	0.33	2.00	1319	78	0.57445626	1.41421
	0.25	1.50	1275	78	0.5	1.22474
	0.32	2.00	1384	78	0.56568542	1.41421
	0.34	2.00	1368	78	0.58309519	1.41421
	0.31	1.80	1397	77	0.55677644	1.34164
	0.26	1.50	1410	79	0.50990195	1.22474
	0.17	0.97	1264	79	0.41231056	0.98489
	0.22	1.40	1348	78	0.46904158	1.18322
	0.23	1.30	1375	79	0.47958315	1.14018
	0.24	1.40	1386	80	0.48989795	1.18322
	0.25	1.40	1394	81	0.5	1.18322
	0.28	1.60	1401	82	0.52915026	1.26491
	0.28	1.60	1405	82	0.52915026	1.26491
	0.30	1.70	1412	83	0.54772256	1.30384
	0.29	1.60	1427	83	0.53851648	1.26491
	0.30	1.70	1437	82	0.54772256	1.30384
	0.32	1.80	1449	83	0.56568542	1.34164
	0.30	1.70	1449	82	0.54772256	1.30384
	0.27	1.50	1431	82	0.51961524	1.22474

Calculation Summary

Data Entry Area

Sample Type	PM	Pitot Tube Correction Factor	0.83	Entered By (initials)	JC
Source	BVS 5	Console ID	URS-001	Checked by (initials)	SB
Condition	Non P	DGMCF	0.971	Corrected by (initials)	
Run	3	$\Delta H_@$	2.015		
Date	9-May	Nozzle Diameter (in)	0.3750	% CO	
Duct Diameter (ft)	9	Std Temp (°F)	68	% CO_2	5.1
Duct Depth (ft)		Bar Press ("Hg, meas)	29.89	% O_2	11.8
Duct Width (ft)		Meter Elev (ft) (rel to Brmtr)	450	% H_2	
		Static Press ("H_2O)	-0.25	% CH_4	

Times		DGM Volumes (as read)		Impinger Catch (g)			
					Initial	Final	
start	14:38	start	145.213	1	369.4	509.9	140.5
stop	15:38	stop	189.442	2	607.7	620.4	12.7
start	17:01	start	189.563	3	756.1	786.2	30.1
stop	18:01	stop	230.463	4	796.5	818.5	22.05
start		start		5			
stop		stop		6			
start		start		7			
stop		stop		8			
start		start		9			
stop		stop		10			
start		start					
stop		stop					
start		start					
stop		stop					
start		start					
stop		stop					
start		start					
stop		stop					
						Total Wt Gain	205.4
Duration	120	Total	85.129				

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	√ΔP	√ΔH
Averages	0.26	1.61	1327	96.8	0.5091	1.2610
Individual Readings	0.27	1.60	1298	97	0.51961524	1.264911
	0.20	1.30	1280	97	0.4472136	1.140175
	0.22	1.40	1289	97	0.46904158	1.183216
	0.22	1.40	1302	97	0.46904158	1.183216
	0.25	1.60	1305	97	0.5	1.264911
	0.25	1.60	1311	97	0.5	1.264911
	0.28	1.70	1339	97	0.52915026	1.30384
	0.30	1.90	1339	98	0.54772256	1.378405
	0.34	2.10	1384	98	0.58309519	1.449138
	0.36	2.20	1385	97	0.6	1.48324
	0.37	2.20	1388	97	0.60827625	1.48324
	0.37	2.20	1387	97	0.60827625	1.48324
	0.23	1.40	1261	96	0.47958315	1.183216
	0.26	1.70	1280	95	0.50990195	1.30384
	0.26	1.60	1302	96	0.50990195	1.264911
	0.25	1.60	1285	96	0.5	1.264911
	0.27	1.70	1303	96	0.51961524	1.30384
	0.28	1.70	1350	97	0.52915026	1.30384
	0.28	1.70	1347	97	0.52915026	1.30384
	0.25	1.50	1359	97	0.5	1.224745
	0.24	1.40	1354	96	0.48989795	1.183216
	0.20	1.10	1349	97	0.4472136	1.048809
	0.19	1.10	1350	96	0.43588989	1.048809
	0.15	0.90	1296	97	0.38729833	0.948683

Calculation Summary

Data Entry Area

Sample Type	Metals	Pitot Tube Correction Factor	0.83	Entered By (initials)	JC
Source	BVS 5	Console ID	URS-005	Checked by (initials)	SB
Condition	Non P	DGMCF	0.981	Corrected by (initials)	
Run	1	$\Delta H_@$	1.947		
Date	8-May	Nozzle Diameter (in)	0.3750	% CO	
Duct Diameter (ft)	9	Std Temp (°F)	68	% CO_2	5.5
Duct Depth (ft)		Bar Press ("Hg, meas)	30.03	% O_2	11.7
Duct Width (ft)		Meter Elev (ft) (rel to Brmtr)	450	% H_2	
		Static Press ("H_2O)	-0.25	% CH_4	

Times		DGM Volumes (as read)		Impinger Catch (g)			
					Initial	Final	
start	13:25	start	550.215	1	712.1	875.2	163.1
stop	13:29	stop	552.518	2	692.2	707.0	14.8
start	15:11	start	554.070	3	627.7	629.3	1.6
stop	16:07	stop	591.745	4	712.7	711.2	-1.5
start	16:49	start	592.000	5	717.7	719.6	1.9
stop	17:49	stop	636.588	6	853.6	868.9	15.3
start		start		7			
stop		stop		8			
start		start		9			
stop		stop		10			
start		start					
stop		stop					
start		start					
stop		stop					
start		start					
stop		stop					
start		start					
stop		stop					
						Total Wt Gain	195.2
Duration	120	Total	84.566				

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	√ΔP	√ΔH
Averages	0.25	1.41	1275	95.3	0.4995	1.1770
Individual Readings	0.27	1.40	1275	83	0.51961524	1.183216
	0.30	1.70	1276	83	0.54772256	1.3038405
	0.29	1.60	1276	83	0.53851648	1.2649111
	0.29	1.60	1285	84	0.53851648	1.2649111
	0.31	1.70	1283	84	0.55677644	1.3038405
	0.30	1.70	1287	84	0.54772256	1.3038405
	0.27	1.50	1308	85	0.51961524	1.2247449
	0.23	1.30	1358	85	0.47958315	1.1401754
	0.17	0.93	1349	86	0.41231056	0.9643651
	0.16	0.88	1330	87	0.4	0.9380832
	0.13	0.70	1275	90	0.36055513	0.83666
	0.10	0.54	1275	92	0.31622777	0.7348469
	0.22	1.20	1177	99	0.46904158	1.0954451
	0.23	1.30	1180	100	0.47958315	1.1401754
	0.24	1.30	1197	101	0.48989795	1.1401754
	0.25	1.40	1210	102	0.5	1.183216
	0.25	1.40	1236	103	0.5	1.183216
	0.25	1.40	1242	105	0.5	1.183216
	0.30	1.70	1273	107	0.54772256	1.3038405
	0.29	1.60	1282	108	0.53851648	1.2649111
	0.30	1.70	1297	108	0.54772256	1.3038405
	0.30	1.70	1310	109	0.54772256	1.3038405
	0.32	1.80	1300	109	0.56568542	1.3416408
	0.32	1.80	1317	109	0.56568542	1.3416408

Calculation Summary

Data Entry Area

Sample Type	Metals	Pitot Tube Correction Factor	0.83	Entered By (initials)	JC
Source	BVS 5	Console ID	URS-005	Checked by (initials)	SB
Condition	Prod	DGMCF	0.981	Corrected by (initials)	
Run	2	$\Delta H_@$	1.947		
Date	8-May	Nozzle Diameter (in)	0.3750	% CO	
Duct Diameter (ft)	9	Std Temp (°F)	68	% CO_2	5.1
Duct Depth (ft)		Bar Press ("Hg, meas)	29.92	% O_2	11.7
Duct Width (ft)		Meter Elev (ft) (rel to Brmtr)	450	% H_2	
		Static Press ("H_2O)	-0.25	% CH_4	

Times		DGM Volumes (as read)		Impinger Catch (g)			
					Initial	Final	
start	21:25	start	638.145	1	707.9	897.2	189.3
stop	22:25	stop	674.889	2	700.1	712.9	12.8
start	00:07	start	675.148	3	603.0	604.5	1.5
stop	01:07	stop	715.954	4	714.6	713.7	-0.9
start		start		5	714.5	714.6	0.1
stop		stop		6	840.8	856.5	15.7
start		start		7			
stop		stop		8			
start		start		9			
stop		stop		10			
start		start					
stop		stop					
start		start					
stop		stop					
start		start					
stop		stop					
start		start					
stop		stop					
						Total Wt Gain	218.5
Duration	120	Total	77.550				

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	√ΔP	√ΔH
Averages	0.24	1.37	1353	78.7	0.4826	1.1541
Individual Readings	0.10	0.56	1107	78	0.31622777	0.74833
	0.11	0.88	1107	78	0.33166248	0.93808
	0.22	1.40	1162	78	0.46904158	1.18322
	0.25	1.60	1202	78	0.5	1.26491
	0.20	1.20	1250	78	0.4472136	1.09545
	0.22	1.40	1318	78	0.46904158	1.18322
	0.26	1.60	1262	78	0.50990195	1.26491
	0.19	1.10	1297	78	0.43588989	1.04881
	0.21	1.10	1354	78	0.45825757	1.04881
	0.10	0.58	1368	77	0.31622777	0.76158
	0.10	0.58	1390	79	0.31622777	0.76158
	0.30	1.70	1472	80	0.54772256	1.30384
	0.28	1.60	1369	76	0.52915026	1.26491
	0.27	1.50	1381	76	0.51961524	1.22474
	0.22	1.20	1380	77	0.46904158	1.09545
	0.23	1.30	1384	78	0.47958315	1.14018
	0.23	1.30	1400	78	0.47958315	1.14018
	0.30	1.60	1409	79	0.54772256	1.26491
	0.34	1.80	1517	80	0.58309519	1.34164
	0.34	1.80	1514	81	0.58309519	1.34164
	0.34	1.80	1513	81	0.58309519	1.34164
	0.36	1.90	1506	81	0.6	1.3784
	0.35	1.90	1502	82	0.59160798	1.3784
	0.25	1.40	1310	82	0.5	1.18322

Calculation Summary

Data Entry Area

Sample Type	Metals	Pitot Tube Correction Factor	0.83	Entered By (initials)	JC
Source	BVS 5	Console ID	URS-005	Checked by (initials)	SB
Condition	Non P	DGMCF	0.981	Corrected by (initials)	JC
Run	3	$\Delta H_@$	1.947		
Date	9-May	Nozzle Diameter (in)	0.3750	% CO	
Duct Diameter (ft)	9	Std Temp (°F)	68	% CO_2	5.1
Duct Depth (ft)		Bar Press ("Hg, meas)	29.89	% O_2	11.8
Duct Width (ft)		Meter Elev (ft) (rel to Brmtr)	450	% H_2	
		Static Press ("H_2O)	-0.25	% CH_4	

Times		DGM Volumes (as read)		Impinger Catch (g)			
					Initial	Final	
start	14:38	start	724.490	1	711.3	892.5	181.2
stop	15:38	stop	768.269	2	703.9	718.7	14.8
start	17:01	start	768.455	3	606.9	608.3	1.4
stop	18:01	stop	813.250	4	712.9	719.2	6.3
start		start		5	717.9	713.5	-4.4
stop		stop		6	822.2	838.0	15.8
start		start		7			
stop		stop		8			
start		start		9			
stop		stop		10			
start		start					
stop		stop					
start		start					
stop		stop					
start		start					
stop		stop					
start		start					
stop		stop					
						Total Wt Gain	215.1
Duration	120	Total	88.574				

	ΔP ("H_2O)	ΔH ("H_2O)	Stack Temp (°F)	DGM Temp (°F)	√ΔP	√ΔH
Averages	0.28	1.51	1322	96.2	0.5289	1.2264
Individual Readings	0.26	1.40	1315	95	0.50990195	1.18322
	0.28	1.50	1316	95	0.52915026	1.22474
	0.30	1.60	1308	96	0.54772256	1.26491
	0.29	1.60	1324	96	0.53851648	1.26491
	0.30	1.60	1331	96	0.54772256	1.26491
	0.31	1.70	1350	96	0.55677644	1.30384
	0.29	1.60	1394	96	0.53851648	1.26491
	0.31	1.70	1383	96	0.55677644	1.30384
	0.25	1.40	1384	97	0.5	1.18322
	0.25	1.30	1385	96	0.5	1.14018
	0.23	1.30	1370	96	0.47958315	1.14018
	0.20	1.10	1355	96	0.4472136	1.04881
	0.23	1.20	1230	94	0.47958315	1.09545
	0.23	1.20	1242	95	0.47958315	1.09545
	0.25	1.30	1258	96	0.5	1.14018
	0.25	1.30	1250	96	0.5	1.14018
	0.25	1.40	1262	96	0.5	1.18322
	0.28	1.50	1287	96	0.52915026	1.22474
	0.30	1.60	1300	97	0.54772256	1.26491
	0.30	1.60	1304	97	0.54772256	1.26491
	0.32	1.70	1338	97	0.56568542	1.30384
	0.35	1.80	1344	98	0.59160798	1.34164
	0.35	1.90	1344	98	0.59160798	1.3784
	0.37	2.00	1358	98	0.60827625	1.41421

Condensable PM Results

Parameter	Run 1	Run 2	Run 3	Field blank	Proof blank
Inorganic (mg)	84.0	69.3	49.2	2.80	3.46
Organic (mg)	2.48	2.18	1.89	1.29	1.56
Filter (mg)	NR	NR	NR	NR	NR
Total (mg)	86.5	71.5	51.1	4.1	5.0
Blank correction (mg) *	4.1	4.1	4.1		
Net condensable PM	82.4	67.4	47.0		

* Allowed by Memorandum to: EPA Regional Air Division Directors, Regions 1-10; from: Stephen Page, Director OAQPS; subject: Interim Guidance on the Treatment of Condensable Particulate Matter Test Results in the Prevention of Significant Deterioration and Nonattainment New Source Review Permitting Programs; April 8, 2014

Filterable PM Results

Parameter	Run 1	Run 2	Run 3
Filter (mg)	34.9	80.4	35.7
Probe/nozzle rinse (mg)	8.01	41.8	20.6
Total filterable PM (mg)	42.9	122.2	56.3

Metals Results

Parameter	Run 1	Run 2	Run 3
Sample volume (dscf)	78.26	73.69	81.47
Sample volume (dscm)	2.216	2.087	2.307
Lead in filter/PNR (ug)	629.0	1070	847
Lead in Imp 1&2 (ug)	6.00	4.69	2.64
Lead in sample (ug)	635.0	1074.7	849.6
Lead Conc. (ug/ft3)	8.113	14.583	10.429
Lead Conc. (ug/m3)	286.5	515.0	368.3
Mercury in filter/PNR (ug)	0.188	0.321	ND
Mercury in Imp 1&2 (ug)	13.7	18.5	19.0
Mercury in Imp 3 (ug)	2.4	1.4	2.34
Mercury in Imp 4&5 (ug)	0.559	0.240	0.546
Mercury in HCl rinse (ug)	7.89	5.95	6.36
Mercury in sample (ug)	24.7	26.4	28.2
Mercury Conc. (ug/ft3)	0.3161	0.3584	0.3467
Mercury Conc. (ug/m3)	11.16	12.66	12.24

Plant Name	Gateway Energy & Coke
Sampling Location	Bypass Stack 5
Date	May 5-6, 2017
CEM Operator	Chandra Sastry
Project Number	60542107

Observed Values

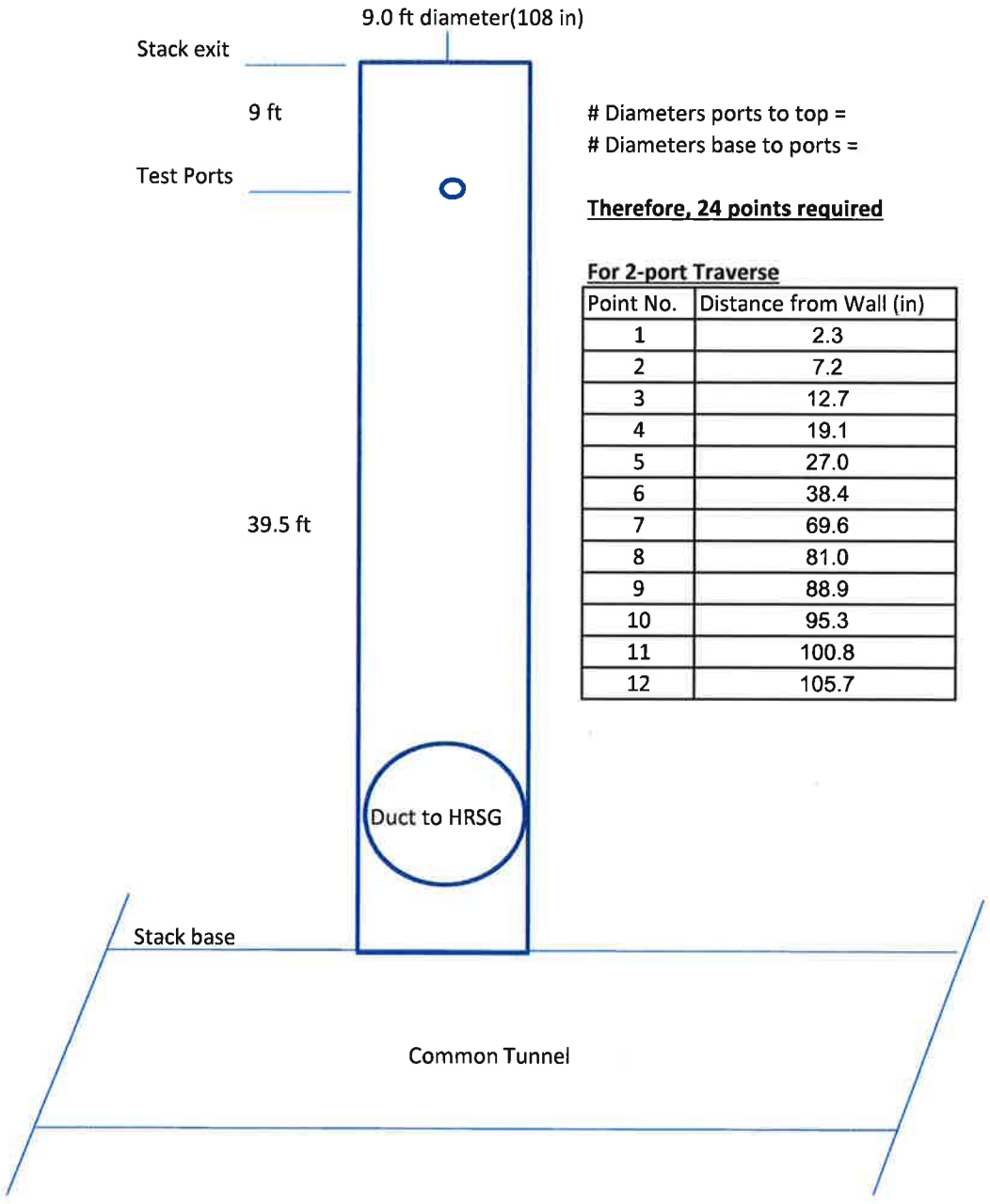
Run No.	Date	Start Time	Stop Time	Start - Stop Time	Reference Method Obs. Value		
					O_2	CO_2	NOX
1	5/5/2017	1520	1641	1520 - 1641	9.6	6.9	33.91
2	5/5/2017	1930	2115	1930 - 2115	7.6	8.1	48.27
3	5/6/2017	1320	1500	1320 - 1500	11.7	5.4	23.51

Bias-Adjusted Values

Run No.	Date	Start Time	Stop Time	Start - Stop Time	Reference Method Adj. Value		
					O_2	CO_2	NOX
1	5/5/2017	1520	1641	1520 - 1641	9.7	7.0	34.61
2	5/5/2017	1930	2115	1930 - 2115	7.7	8.5	49.34
3	5/6/2017	1320	1500	1320 - 1500	11.7	5.5	24.04

RM Sample Data

Bypass Vent Stack Traverse Points



Diameters ports to top = 1.0
Diameters base to ports = 4.4

Therefore, 24 points required

For 2-port Traverse

Point No.	Distance from Wall (in)
1	2.3
2	7.2
3	12.7
4	19.1
5	27.0
6	38.4
7	69.6
8	81.0
9	88.9
10	95.3
11	100.8
12	105.7

Sample Type	HCl/Cl_2 EPA Method 26A	Date 5/5/17	Nozzle Dia (in) 0.375	Page 1 of 1	
Project Name	GCO Stack Tests	Cond	Run 1	Barometer ID Weather Channel	Train Leak Rate (cfm @ "Hg)
Project Number	60542107	Console ID URS-001	Bar. Press. ("Hg) 29.84	Initial 0.0 @ 4"	
Facility	SunCoke Energy GCO	ΔH@ 2.015	Stat. Press. ("H_2O) -0.31	Final 0.0 @ 5"	
Source	ByPass Vent Stack #5	K_f	Probe ID 1704522	Pitot Tube Leak Check ("H_2O@"H_2O)	
Operator	WCT/HO/SP	DGMCF 0.971	Pitot ID	Initial (-) ✓ @ 4"	
Duct Dimension(s)	9' ø	Filter No.	PTCF 0.83	Initial (+) ✓ @ 4"	
Nozzle Calibration	0.375 0.375 0.375		Meter Elevation (ft) (relativeto Barometer) 540	Final (-) ✓ @ 5"	
Caliper ID				Final (+) ✓ @ 5"	

Point	~~Clock Time~~ 15:26	DGM Reading (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F) Stack	Probe Target 248-273	Filter Target 248-273	Imp Exit Target <68	DGM Outlet	Vacuum ("Hg)
B/2	0	811.706	0.28	1.7	1469	N/A	248	58	93	2½
11	3	813.9	0.28	1.6	1468		250	56	94	2½
10	6	816.1	0.28	1.6	1463		255	55	94	2½
9	9	818.2	0.26	1.5	1464		249	57	96	2½
8	12	820.3	0.29	1.6	1458		258	58	97	3
7	15	822.4	0.27	1.6	1450		250	59	97	3
6	18	824.5	0.25	1.4	1420		251	61	98	2½
5	21	826.6	0.28	1.6	1401		254	62	99	3
4	24	828.7	0.28	1.6	1410		257	63	99	3
3	27	830.9	0.24	1.4	1395		259	62	100	2½
2	30	833.0	0.21	1.2	1383		257	57	100	2
1	33	834.8	0.15	0.9	1274		248	55	100	2
Stop	36	836.497								
A/2	36	836.538	0.23	1.4	1397		254	62	93	2½
11	39	838.5	0.24	1.4	1423		257	57	94	2½
10	42	840.5	0.22	1.3	1424		263	52	94	2½
9	45	842.4	0.23	1.3	1413		259	54	94	2½
8	48	844.3	0.23	1.3	1415		260	56	94	2½
7	51	846.2	0.28	1.6	1412		260	57	95	3
6	54	848.3	0.28	1.6	1385		255	58	95	3
5	57	850.4	0.26	1.5	1362		260	59	97	3
4	60	852.6	0.25	1.5	1366		256	61	97	3
3	63	854.7	0.23	1.4	1361		249	62	97	2½
2	66	856.7	0.16	0.97	1318		255	63	97	2
1	69	858.5	0.17	1.0	1094	TC	258	63	97	2
Stop	72	860.195			1318 (out of duct)	leak				
	~~18:32~~									
	17:05									

Notes:

SDS-21: HCl, Cl_2 by EPA Method 26A
Per EM SOP-021
Issued: January 2017

Sample Type	HCl/Cl_2 EPA Method 26A	Date 5/5/17	Nozzle Dia (in) 0.375	Page 1 of 1	
Project Name	GCO Stack Tests	Cond / Run 2	Barometer ID Weather Channel	Train Leak Rate (cfm @ "Hg)	
Project Number	60542107	Console ID URS-001	Bar. Press. ("Hg) 29.83	Initial 0.005 @ 10"	
Facility	SunCoke Energy GCO	ΔH@ 2.015	Stat. Press. ("H_2O) -0.31	Final 0.01 @ 5"	
Source	ByPass Vent Stack #5	K_r	Probe ID 1704522	Pitot Tube Leak Check ("H_2O@"H_2O)	
Operator	WCT/HO/SP	DGMCF 0.971	Pitot ID	Initial (-) ~~0.005~~ @ 10"	
Duct Dimension(s)	9'	Filter No.	PTCF 0.83	Initial (+) 0 @ 4"	
Nozzle Calibration			Meter Elevation (ft) (relativeto Barometer) 548 ~~548~~ 450	Final (-) ✓ @ 4"	
Caliper ID				Final (+) ✓ @ 4"	

Point	1930 Clock Time	DGM Reading (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F) Stack	Probe Target 248-273	Filter Target 248-273	Imp Exit Target <68	DGM Outlet	Vacuum ("Hg)
A12	0	860.517	0.17	1.0	1374	N/A	256	65	97	2
11	3	862.2	0.18	1.1	1387		256	56	97	2
10	6	864.0	0.19	1.1	1403		257	55	97	2
9	9	865.8	0.20	1.2	1422		261	51	98	2
8	12	867.6	0.24	1.4	1455		258	58	98	2 1/2
7	15	869.6	0.27	1.6	1478		259	60	99	3
6	18	871.7	0.31	1.8	1505		256	61	100	3 1/2
5	21	874.0	0.29	1.6	1509		256	62	100	3
4	24	876.2	0.26	1.5	1519		258	63	100	3
3	27	878.2	0.25	1.4	1546		257	64	101	3
2	30	880.2	0.18	1.0	1449		255	64	101	3
1	33	882.2	0.13	0.75	1400		256	64	102	2
Stop	36	883.744								
~~B12~~	~~36~~	~~883.816~~								
B12	36	884.002	0.30	1.8	1595		272	57	99	3 1/2
11	39	886.3	0.30	1.6	1621		260	51	97	3 1/2
10	42	888.5	0.28	1.5	1619		260	51	97	3
9	45	890.7	0.27	1.4	1611		254	51	96	2 1/2
8	48	892.7	0.31	1.6	1609		255	51	95	3
7	51	894.9	0.31	1.6	1600		258	52	95	3
6	54	897.1	0.29	1.5	1555		255	53	95	2 1/2
5	57	899.2	0.28	1.5	1550		258	54	94	2 1/2
4	60	901.3	0.27	1.5	1551		258	54	94	2 1/2
3	63	903.4	0.26	1.4	1550		256	54	92	2 1/2
2	66	905.5	0.25	1.3	1549		259	54	92	2 1/2
1	69	907.3	0.18	0.98	1540		259	55	92	2 1/2
Stop	72 2:11	909.057								

Notes:

SDS-21: HCl, Cl_2 by EPA Method 26A
***Per** EM SOP-021*
***Issued:** January 2017*

Sample Type	HCl/Cl_2 EPA Method 26A	Date 5/6/19	Nozzle Dia (in) 0.375	Page 1 of 1	
Project Name	GCO Stack Tests	Cond	Run 3	Barometer ID Weather Channel	Train Leak Rate (cfm @ "Hg)
Project Number	60542107	Console ID URS-001	Bar. Press. ("Hg) 29.79	Initial	0 @ 10"
Facility	SunCoke Energy GCO	ΔH@ 2.015	Stat. Press. ("H_2O) -0.31	Final	0 @ 6"
Source	ByPass Vent Stack #5	K_f	Probe ID 170452	Pitot Tube Leak Check ("H_2O@"H_2O)	
Operator	WCT/HO/SP	DGMCF 0.971	Pitot ID	Initial (-)	✓ @ 3.5"
Duct Dimension(s)	9"	Filter No.	PTCF 0.83	Initial (+)	✓ @ 4"
Nozzle Calibration			Meter Elevation (ft) (relativeto Barometer) 450	Final (-)	✓ @ 4"
Caliper ID				Final (+)	✓ @ 4"

Point	Clock Time	DGM Reading (ft³)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F)					Vacuum ("Hg)
					Stack	Probe Target 248-273	Filter Target 248-273	Imp Exit Target <68	DGM Outlet	
B12	0	912.830	0.30	1.8	1217	N/A	250	64	100	3
11	3	915.6	0.29	1.9	1045		253	60	100	3
10	6	917.8	0.27	1.9	1065		249	58	101	3
9	9	920.2	0.29	2.1	1063		262	57	101	4
8	12	922.7	0.29	2.1	1311		254	58	102	4
7	15	925.3	0.32	2.0	1337		253	61	103	3½
6	18	927.6	0.36	2.2	1381		259	61	103	4
5	21	930.1	0.38	2.3	1392		256	62	104	4
4	24	932.7	0.35	2.0	1398		252	62	105	3½
3	27	935.1	0.40	2.3	1430		252	62	105	4
2	30	937.7	0.29	1.6	1382		256	63	106	3
1	33	939.9	0.20	1.1	1350		250	63	106	2
Stop	36	941.687								
A12	36	941.908	0.29	1.7	1407		253	68	105	3
11	39	944.1	0.28	1.7	1403		261	67	105	3
10	42	946.3	0.34	2.0	1407		258	56	106	3½
9	45	948.7	0.39	2.3	1385		266	55	107	4
8	48	951.3	0.30	1.8	1354		260	56	107	3½
7	51	953.6	0.27	1.6	1306		264	56	107	3
6	54	955.8	0.31	1.9	1297		255	56	109	3½
5	57	958.1	0.29	1.8	1295		264	56	109	3
4	60	960.4	0.25	1.6	1295		257	57	110	3
3	63	962.6	0.26	1.6	1287		250	56	110	3
2	66	964.8	0.18	1.2	1265		257	56	111	3
1	69	967.0	0.13	0.85	1200		253	56	111	2
Stop	72	968.742								
	~~15:04~~									
	14:58									

Notes:

SDS-21: HCl, Cl_2 by EPA Method 26A
Per EM SOP-021
Issued: January 2017

Project Name: GCO Stack Tests

Project Number: 60542107

Date: 5/5/17

Source: ByPass Vent Stack #5

HCl/Cl2
EPA Method 26A

Condition No. _____

Run No. 1

Balance ID Scout Pro-01

Recovered by JC

Moisture Determination

Imp No.	Contents	Vol (mL)	Configuration	Initial Wt (g)	Final Wt (g)
1	0.1 N H_2SO_4	100	G/S	716.5	~~804.5~~
2	0.1 N H_2SO_4	100	G/S	625.3	629.9
3	Water	100	Mod	631.7	633.8
4	Silica Gel	~200g	Mod	928.1	937.2

Sample Log

Sample ID Number	Sample Container	Description
-M26A-AcdImp	1 L Nalgene	Acid Impinger Catch & Rinse
~~-M26A-AlkImp~~	~~500 mL Nalgene~~	~~Alkaline Impinger Catch & Rinse~~

Sample Recovery Checklist

_____ (Only if transfer line is used). Disconnect transfer line, and rinse three times with DI water into acid impinger catch bottle. Transfer bottle to laboratory with impinger train.

_____ Using water, rinse filter support, back half of filter holder and any connecting glassware into the acid impinger catch bottle.

_____ Disassemble sample train, wipe off excess water and weigh each impinger. Record the final weights in the Moisture Determination section of this data sheet.

Note condition of the silica gel impinger. ____% spent

_____ Pour contents of the 1st, 2nd ~~and 3rd~~ (containing acid) impingers into the Acid impinger catch bottle(s). Rinse impingers and connecting glassware with deionized water into the same bottle(s). Complete acid impinger sample label.

_____ ~~Pour the contents of the 4th and 5th impingers (containing NaOH) into the alkaline impinger catch bottle(s). Rinse impingers and connecting glassware with deionized water into the same bottle(s). Complete alkaline impinger sample label.~~

_____ Log samples into logbook and store appropriately.

Notes:

Project Name: GCO Stack Tests

Project Number: 60542107

Date: 5/5/17

Source: ByPass Vent Stack #5

HCl/Cl2
EPA Method 26A

Condition No. _____

Run No. 2

Balance ID _____

Recovered by JC

Moisture Determination

Imp No.	Contents	Vol (mL)	Configuration	Initial Wt (g)	Final Wt (g)
1	0.1 N H_2SO_4	100	G/S	761.3	~~864.5~~ 850.7
2	0.1 N H_2SO_4	100	G/S	776.8	781.1
3	Water	100	Mod	651.2	652.9
4	Silica Gel	~200g	Mod	870.4	879.0

Sample Log

Sample ID Number	Sample Container	Description
-M26A-AcdImp	1 L Nalgene	Acid Impinger Catch & Rinse
~~-M26A-AlkImp~~	~~500 mL Nalgene~~	~~Alkaline Impinger Catch & Rinse~~

Sample Recovery Checklist

_____ (Only if transfer line is used). Disconnect transfer line, and rinse three times with DI water into acid impinger catch bottle. Transfer bottle to laboratory with impinger train.

_____ Using water, rinse filter support, back half of filter holder and any connecting glassware into the acid impinger catch bottle.

_____ Disassemble sample train, wipe off excess water and weigh each impinger. Record the final weights in the Moisture Determination section of this data sheet.

Note condition of the silica gel impinger. ____% spent

_____ Pour contents of the 1st, 2nd ~~and 3rd~~ (containing acid) impingers into the Acid impinger catch bottle(s). Rinse impingers and connecting glassware with deionized water into the same bottle(s). Complete acid impinger sample label.

_____ ~~Pour the contents of the 4th and 5th impingers (containing NaOH) into the alkaline impinger catch bottle(s). Rinse impingers and connecting glassware with deionized water into the same bottle(s). Complete alkaline impinger sample label.~~

_____ Log samples into logbook and store appropriately.

Notes:

Project Name GCO Stack Tests

Project Number 60542107

Date 5/5/17 test 5/6/17

Source ByPass Vent Stack #5

HCl/Cl2
EPA Method 26A

Condition No. _____

Run No. 3

Balance ID _____

Recovered by JC

Moisture Determination

Imp No.	Contents	Vol (mL)	Configuration	Initial Wt (g)	Final Wt (g)
1	0.1 N H_2SO_4	100	G/S	718.8	823.6
2	0.1 N H_2SO_4	100	G/S	626.4	630.0
3	Water	100	Mod	633.6	635.2
4	Silica Gel	~200g	Mod	923.3	934.5

Sample Log

Sample ID Number	Sample Container	Description
-M26A-AcdImp	1 L Nalgene	Acid Impinger Catch & Rinse
~~-M26A-AlkImp~~	~~500 mL Nalgene~~	~~Alkaline Impinger Catch & Rinse~~

Sample Recovery Checklist

_____ (Only if transfer line is used). Disconnect transfer line, and rinse three times with DI water into acid impinger catch bottle. Transfer bottle to laboratory with impinger train.

_____ Using water, rinse filter support, back half of filter holder and any connecting glassware into the acid impinger catch bottle.

_____ Disassemble sample train, wipe off excess water and weigh each impinger. Record the final weights in the Moisture Determination section of this data sheet.

Note condition of the silica gel impinger. ____% spent

_____ Pour contents of the 1st, 2nd ~~and 3rd~~ (containing acid) impingers into the Acid impinger catch bottle(s). Rinse impingers and connecting glassware with deionized water into the same bottle(s). Complete acid impinger sample label.

_____ ~~Pour the contents of the 4th and 5th impingers (containing NaOH) into the alkaline impinger catch bottle(s). Rinse impingers and connecting glassware with deionized water into the same bottle(s). Complete alkaline impinger sample label.~~

_____ Log samples into logbook and store appropriately.

Notes:

RDS-19: HCl/Cl₂ by EPA Method 26A
Per EM SOP-021
Issued: August 2016

Sample Type	Controlled Condensation; H_2SO_4/SO_2	Date	5/5/2017	Operator	JTF	Page	1 of 1
Project Name	GCO Stack Tests	Condition		Barometer ID		Train Leak Rate (cfm@"Hg)	
Project Number	60542107	Run	1	Bar. Press. ("Hg)	30.09	Initial	0.005 @ 17.5
Facility	Suncoke Energy	Console ID	Oak Ridge-URS-005			Final	0.004 @ 15.5
Source	Bypass Vent Stack #5	DGMCF	0.981	Meter Elevation (ft) (relative to Barometer)			
Duct Dimension(s)	91						

Coil ID	Clock Time	DGM Reading (ft^3)	ΔH ("H_2O)	Temperature (°F)					Vacuum ("Hg)	O_2 (%)
				Probe (if used) Target 600	Filter or IGS Target 550	Cond Exit Target 150	Imp Exit Target <68	DGM		
	16:50	486.462	0.30	625	610	149	65	97	8.0	
	16:55	488.17	0.30	613	636	149	63	97	8.0	11.8
	17:00	489.90	0.30	615	630	150	63	97	8.0	
	17:05	491.60	0.30	621	633	141	62	97	8.0	
	17:10	493.32	0.30	621	617	142	59	98	8.0	10.4
	17:15	495.18	0.30	627	599	142	52	99	8.0	
	17:20	496.90	0.30	626	608	142	52	100	8.0	9.8
	17:25	498.52	0.30	615	608	141	51	99	8.0	
	17:30	500.22	0.30	624	633	142	51	99	8.0	
	17:35	501.95	0.30	617	606	140	50	99	8.0	9.9
	17:40	503.67	0.30	613	618	143	50	99	8.0	
	17:45	505.42	0.30	627	603	142	50	100	8.0	
	17:50	507.155								

Notes: ΔH 0.3, 1 Hour run.

SDS-34: H_2SO_4/SO_2 by Controlled Condensation
Per EM SOP-066
Issued: February 2017

Sample Type	Controlled Condensation; H_2SO_4/SO_2	Date 5/5/2017	Operator JMF	Page 1 of 1
Project Name	GCO Stack Tests	Condition	Barometer ID	Train Leak Rate (cfm@"Hg)
Project Number	60542107	Run 2	Bar. Press. ("Hg) see H01	Initial 0.003 @ 17.5
Facility	Suncoke Energy	Console ID Oak Ridge-025-005		Final 0.004 @ 17.0
Source	Bypass vent stack #5	DGMCF 0.981.	Meter Elevation (ft) (relative to Barometer)	
Duct Dimension(s)	9'			

Coil ID	Clock Time	DGM Reading (ft^3)	ΔH ("H_2O) JMF 5/5/17	Temperature (°F)					Vacuum ("Hg)	O_2 (%)
				Probe (if used) Target 600	Filter or IGS Target 550	Cond Exit Target 140	Imp Exit Target <68	DGM		
2	19:30	507.908	0.30	619	622	135	60	99	7.0	
	19:35	509.64	0.30	618	664	141	49	99	7.0	
	19:40	511.35	0.30	624	~~627~~ JMF 657	142	47	99	7.0	8.5
	19:45	513.03	0.30	619	645	142	46	100	7.0	
	19:50	514.70	0.30	613	635	143	46	101	7.0	
	19:55	516.42	0.30	622	624	144	46	101	8.0	7.7
	20:00	518.15	0.30	620	610	143	46	102	8.0	
	20:05	519.88	0.30	617	602	143	46	102	8.0	
	20:10	521.60	0.30	618	601	143	47	103	8.5	10.7
	20:15	523.34	0.30	615	610	143	47	103	8.5	
	20:20	525.07	0.30	614	613	143	48	104	8.5	
	20:25	526.86	0.30	619	612	143	48	104	8.5	7.6
END	20:30	528.586								

Notes:

SDS-34: H_2SO_4/SO_2 by Controlled Condensation
Per EM SOP-066
Issued: February 2017

Sample Type	Controlled Condensation; H_2SO_4/SO_2	Date	5/6/2017	Operator	JMF	Page	1 of 1
Project Name	GCO Stack Tests	Condition		Barometer ID		Train Leak Rate (cfm@"Hg)	
Project Number	60542107	Run	3	Bar. Press. ("Hg)	29.91	Initial	0.002 @ 20.5
Facility	Suncoke Energy	Console ID	Oak Ridge - URS-005			Final	0.004 @ 17.0
Source	Bypass vent stack #5	DGMCF	0.981	Meter Elevation (ft) (relative to Barometer)			
Duct Dimension(s)	91						

Coil ID	Clock Time	DGM Reading (ft^3)	ΔH ("H_2O)	Temperature (°F)					Vacuum ("Hg)	O_2 (%)
				Probe (if used) Target 600	Filter or IGS Target 550	Cond Exit Target 140	Imp Exit Target <68	DGM		
3	13:22	529.305	0.30	619	627	141	60	106	5.5	
	13:27	531.10	0.30	617	637	140	58	106	6.0	
	13:32	532.80	0.30	620	629	143	56	106	5.5	
	13:37	534.50	0.30	625	604	145	56	106	6.0	13.7
	13:42	536.19	0.30	622	601	144	57	106	6.0	
	13:47	537.95	0.30	615	601	144	57	106	6.0	12.3
	13:52	539.78	0.30	620	596	143	57	106	6.0	
	13:57	541.33	0.30	619	631	144	57	107	6.0	
	14:02	543.08	0.30	615	613	143	57	107	6.0	11.8
	14:07	544.73	0.30	618	600	143	58	108	6.0	
	14:12	546.44	0.30	623	606	144	58	108	6.0	
	14:17	548.14	0.30	617	603	139	57	108	6.5	12.8
	14:22	549.852								

Notes:

SDS-34: H_2SO_4/SO_2 by Controlled Condensation
Per EM SOP-066
Issued: February 2017

Sample Type:	Filt and Cond PM (M5/M202)	Date	3/8/17	Nozzle Dia (in)	0.375
Project Name	GCO Stack Tests	Cond	Run 1	Barometer/Weather	Clear
Project Number	60542107	Console ID	URS-001	Bar. Press. ("Hg)	30.03
Facility	SunCoke Energy GCO	ΔH@	2.015	Stat. Press. ("H_2O)	-0.25
Source	ByPass Vent Stack #5	K_r		Probe ID	1704522
Operator	WCT/HO/SP	DGMCF	0.971	Pitot ID	
Duct Dimension(s)	9"	Filter No.		PTCF	0.83
Nozzle Calibration	0.375 / 0.375 / 0.375			Meter Elevation (ft) (relative to Barometer)	450
Caliper ID					

Page	1 of 1

Train Leak Rate (cfm @ "Hg)

Initial	0.003 @ 13"
Final	0.018 @ 10"

Pitot Tube Leak Check ("H_2O@"H_2O)

Initial (-)	✓ @ 4"
Initial (+)	✓ @ 4
Final (-)	✓ @ 4"
Final (+)	✓ @ 4"

Point	Clock Time	DGM Reading (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F)						Vacuum ("Hg)
					Stack	Probe Target 248±25	Filter Target 248±25	CPM Filter* Target: near but <85	Imp Exit Target <68	DGM Outlet	
	1325										
D1	0	971.208	0.18	1.0	1125	N/A	232	83	62	95	2½
~~2~~ *	3:30	973.178									
	3:30	973.884									
2	5	974.7	0.21	1.4	1267		238	83	68	84	3
3	10	977.9	0.21	1.4	1280		238	82	67	84	2½
4	15	981.5	0.23	1.4	1281		240	82	64	85	2½
5	20	984.9	0.25	1.5	1290		241	82	62	85	2½
6	25	988.3	0.26	1.6	1292		245	82	61	85	2½
7	30	991.8	0.29	1.8	1309		247	82	62	85	3
8	35	995.5	0.33	2.0	1334		248	82	64	86	3½
9	40	999.6	0.35	2.1	1346		246	83	62	88	3½
10	45	1003.7	0.34	2.0	1347		253	84	63	89	4½
11	50	1007.6	0.36	2.1	1354		250	84	65	92	4½
12	55	1011.7	0.38	2.3	1345		247	85	68	95	4½
Stop	1607 60	1016.117									
C1/2	60	1016.269	0.20	1.2	1220		249	86	67	97	3
11	65	1019.4	0.25	1.6	1247		244	86	57	97	3½
10	70	1023.0	0.28	1.8	1249		247	85	58	99	4½
9	75	1026.7	0.28	1.8	1262		249	77	57	99	5
8	80	1030.4	0.28	1.8	1265		249	76	57	101	5½
7	85	1034.2	0.26	1.6	1279		245	76	58	102	5
6	90	1037.8	0.28	1.7	1319		255	77	60	104	5
5	95	1041.6	0.25	1.5	1318		253	81	63	104	5
4	100	1045.1	0.23	1.4	1327		243	84	64	104	4½
3	105	1048.5	0.20	1.2	1324		247	83	62	104	4
2	110	1051.7	0.17	1.1	1298		251	81	61	103	3½
1	115	1054.7	0.10	0.60	1294		241	84	64	103	2½
Stop	120	1057.114									
	17:49										

Notes: Power Trip @ 3:30 (13:28:30); resumed @ 15:10:30.

* Remember to record Final CPM Filter Temperature

SDS-36: PM (Filt & Cond) by EPA Methods 5/202
Per: EM SOP-047
Issued: November 2015

Sample Type:	Filt and Cond PM (M5/M202)	Date 5/8/17	Nozzle Dia (in) 0.375	Page 1 of 1	
Project Name	GCO Stack Tests	Cond	Run 2	Barometer ID Weather Channel	Train Leak Rate (cfm @ "Hg)
Project Number	60542107	Console ID URS-001	Bar. Press. ("Hg) 29.92	Initial	0.003 @ 12"
Facility	SunCoke Energy GCO	ΔH@ 2.015	Stat. Press. ("H_2O) -0.25	Final	*0.0 @ 9"
Source	ByPass Vent Stack #5	K_r	Probe ID 1704522	Pitot Tube Leak Check ("H_2O@"H_2O)	
Operator	WCT/HO/SP	DGMCF 0.971	Pitot ID	Initial (-)	✓ @ 4"
Duct Dimension(s)	9"	Filter No.	PTCF 0.83	Initial (+)	✓ @ 4"
Nozzle Calibration			Meter Elevation (ft) (relative to Barometer) 450	Final (-)	✓ @ 4"
Caliper ID				Final (+)	✓ @ 4"

Point	21:25 Clock Time	DGM Reading (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F)						Vacuum ("Hg)
					Stack	Probe Target 248±25	Filter Target 248±25	CPM Filter* Target: near but <85	Imp Exit Target <68	DGM Outlet	
C12	0	058.146	0.23	1.4	1226	N/A	239	83	61	79	2½
11	5	61.5	0.27	1.7	1251		245	79	58	79	3½
10	10	65.1	0.23	1.4	1230		246	78	61	78	3
9	15	68.4	0.26	1.6	1273		245	77	63	78	3½
8	20	72.0	0.31	1.9	1291		242	77	65	79	4
7	25	75.8	0.33	2.0	1319		247	76	62	78	5
6	30	79.9	0.25	1.5	1275		240	76	59	78	4
5	35	83.3	0.32	2.0	1384		247	76	59	78	5
4	40	87.1	0.34	2.0	1368		246	76	59	78	6
3	45	~~90~~ 91.0	0.31	1.8	1397		247	77	59	77	5½
2	50	94.8	0.26	1.5	1411		249	75	59	79	4½
1	55	98.4	0.17	0.97	1264		243	77	58	79	3½
Stop	60	101.122									
Δ1	60	102.412	0.22	1.4	1348		244	81	58	78	3½
2	65	105.6	0.23	1.3	1375		248	78	50	79	3
3	70	108.8	0.24	1.4	1386		247	78	52	80	3
4	75	111.9	0.25	1.4	1394		248	78	54	81	3
5	80	114.9	0.28	1.6	1401		246	78	54	82	4
6	85	118.4	0.28	1.6	1405		247	78	55	82	4
7	90	122.0	0.30	1.7	1412		247	77	56	83	5
8	95	125.6	0.29	1.6	1427		248	77	56	83	5
9	100	129.2	0.30	1.7	1437		246	78	59	82	5
10	105	132.7	0.32	1.8	1449		237	81	61	83	5½
11	110	136.3	0.30	1.7	1449		245	84	62	82	6
12	115	140.0	0.27	1.5	1431		242	85	65	82	5
Stop	120	143.557									
	01:07										

Notes: * Inlet of filter. Nozzle & probe broke during post leak check

*Remember to record Final CPM Filter Temperature

SDS-36: PM (Filt & Cond) by EPA Methods 5/202 Per: EM SOP-047 Issued: November 2015

Sample Type:	Filt and Cond PM (M5/M202)	Date 5/9/17		Nozzle Dia (in) 0.375	Page 1 of 1
Project Name	GCO Stack Tests	Cond	Run 3	Barometer (Weather Channel)	Train Leak Rate (cfm @ "Hg)
Project Number	60542107	Console ID URS-001		Bar. Press. ("Hg) 29.89	Initial 0.005 @ 11"
Facility	SunCoke Energy GCO	ΔH@ 2.015		Stat. Press. ("H_2O) -0.25	Final 0.005 @ 7"
Source	ByPass Vent Stack #5	K_f		Probe ID 1704522	Pitot Tube Leak Check ("H_2O@"H_2O)
Operator	WCT/HO/SP	DGMCF 0.971		Pitot ID	Initial (-) ✓ @ 4"
Duct Dimension(s)	9'	Filter No.		PTCF 0.83	Initial (+) ✓ @ 4"
Nozzle Calibration				Meter Elevation (ft) (relative to Barometer) 450	Final (-) ✓ @ 4"
Caliper ID					Final (+) ✓ @ 4"

Point	Clock Time 1438	DGM Reading (ft^3)	ΔP ("H_2O) 0.27	ΔH ("H_2O) 1.6	Temperature (°F) Stack	Probe Target 248±25	Filter Target 248±25	CPM Filter* Target: near but <85	Imp Exit Target <68	DGM Outlet	Vacuum ("Hg)
~~0.10~~			~~0.65~~	~~1466~~							
* D1	0	145.213	~~0.20~~	~~1.6~~	~~1298~~	N/A	240	107	67	97	2
2	5	148.4	0.20	1.3	1280		247	106	66	97	2½
3	10	151.4	0.22	1.4	1289		246	103	63	97	3
4	15	154.7	0.22	1.4	1302		254	102	64	97	3
5	20	158.0	0.25	1.6	1305		248	101	66	97	3
6	25	161.5	0.25	1.6	1311		242	98	67	97	3
7	30	165.2	0.28	1.7	1339		255	96	68	97	3½
8	35	168.7	0.30	1.9	1339		237	91	60	98	4
9	40	172.6	0.34	2.1	1384		243	85	56	98	5
10	45	176.7	0.36	2.2	1385		237	82	55	97	5
11	50	181.0	0.37	2.2	1388		247	79	55	97	5½
12	55	185.3	0.37	2.2	1389		252	80	55	97	5½
Stop	60	189.442									
12	60	189.563	0.23	1.4	1261		252	102	68	96	3½
11	65	192.9	0.26	1.7	1280		247	99	61	95	4
10	70	196.5	0.26	1.6	1302		251	95	64	96	4
9	75	200.2	0.25	1.6	1285		252	94	65	96	4
8	80	203.7	0.27	1.7	1303		251	91	62	96	4½
7	85	207.5	0.28	1.7	1350		241	88	63	94	4½
6	90	211.2	0.28	1.7	1347		244	87	65	97	4½
5	95	214.9	0.25	1.5	1359		246	85	62	97	4
4	100	218.3	0.24	1.4	1354		239	85	60	96	4
3	105	221.7	0.20	1.1	1349		246	85	59	97	3
2	110	225.0	0.19	1.1	1350		244	87	60	96	3½
1	115	227.7	0.15	0.90	1296		237	88	60	97	3
Stop	120	230.463									
	18:01										

Notes: * paused 3:04 into run @ ~1:37, restarted 1441

* Remember to record Final CPM Filter Temperature

SDS-36: PM (Filt & Cond) by EPA Methods 5/202 Per: EM SOP-047 Issued: November 2015

Project Name: GCO Stack Tests

Project Number: 60503939

Date: 5/8/17

Source: ByPass Vent Stack #5

Particulate Matter (incl. Condensable)
EPA Method 5/202

Condition No. _____

Run No. 1

Balance ID Scout Mn - 02

Recovered by JC

Moisture Determination

Imp No.	Contents	Vol (mL)	Configuration	Initial Wt (g)	Final Wt (g)
1	empty		K/O	369.3	464.9
2	empty		Mod	607.4	616.7
3	Water	100	Mod	741.8	760.0
4	Silica Gel	~300g	Mod	829.4	853.7
5					

Filter

Filter ID Number	

Sample Log

Sample ID Number	Sample Container	Description
-M5/202-PNR	250 ml	Probe and Nozzle Rinse
-M5/202-Filt	Petri Dish	Filter
-M5/202-WtRns	1000 ml	Water Rinse
-M5/202-OrgRns	250 ml	Organic Rinse
-M5/202-CPMFilt	Petri Dish	CPM Filter

Sample Recovery Checklist

_____ Rinse and brush probe and nozzle with acetone (three times) into PNR sample bottle.

_____ Disconnect transfer line. Rinse with water (two times) into water rinse sample bottle. Rinse with acetone (one time) and hexane (two times) into the organic rinse sample bottle.

_____ Transfer water from knockout impinger to second impinger. Ensure that water level is at least 1 cm above stem tip. Add water if necessary.

Volume of water added: _____

_____ If all water in knockout impinger will not fit in second impinger, replace stem on knockout impinger. Ensure that the water level in the first impinger is at least 1 cm above stem tip. Add water if necessary.

Volume of water added: _____.

_____ Purge with nitrogen for one hour at >14 liters per minute. Record start and end times on the data sheet.

Start _____ Stop _____

_____ Separate filter holder and place filter in clean pre-rinsed glass petri dish. Complete Filt sample label.

_____ Rinse front half of filter holder with acetone (three times) into PNR bottle. Complete probe and nozzle rinse (PNR) sample label.

_____ Rinse the back half of the filter holder and any connecting glassware with water (two times) into the water rinse sample bottle.

_____ Rinse the back half of the filter holder and any connecting glassware with acetone (one time) and with hexane (two times) into the organic rinse sample bottle.

_____ Separate CPM filter holder and place CPM filter in clean pre-rinsed glass petri dish. Complete CPM-Filt sample label.

_____ Disassemble sample train, wipe off excess water and weigh each impinger. Record the final weights in the Moisture Determination section of this data sheet

Note condition of the silica gel impinger. ____% spent

_____ Pour the contents of the first two impingers into the water rinse catch bottle(s). Rinse impingers, connecting glassware. And the front half of the CPM filter holder two times with water into the same bottles. Complete water rinse sample label.

_____ Rinse the first two impingers, connecting glassware, and the front half of the CPM filter holder acetone (one time) and hexane (two times) into the organic rinse sample bottle(s)

_____ Log samples into logbook and store appropriately.

Notes:

Project Name: GCO Stack Tests

Project Number: 60503939

Date: 5/5/17

Source: ByPass Vent Stack #5

Particulate Matter (incl. Condensable)
EPA Method 5/202

Condition No. _____

Run No. 2

Balance ID _____

Recovered by JC

Moisture Determination

Imp No.	Contents	Vol (mL)	Configuration	Initial Wt (g)	Final Wt (g)	
1	empty		K/O	356.8	~~464.9~~	459.0
2	empty		Mod	596.4	~~696.7~~	601.5
3	Water	100	Mod	695.3	~~760.0~~	725.8
4	Silica Gel	~300g	Mod	816.8	~~853.7~~	840.4
5						

Filter

Filter ID Number	

Sample Log

Sample ID Number	Sample Container	Description
-M5/202-PNR	250 ml	Probe and Nozzle Rinse
-M5/202-Filt	Petri Dish	Filter
-M5/202-WtRns	1000 ml	Water Rinse
-M5/202-OrgRns	250 ml	Organic Rinse
-M5/202-CPMFilt	Petri Dish	CPM Filter

Sample Recovery Checklist

_____ Rinse and brush probe and nozzle with acetone (three times) into PNR sample bottle.

_____ Disconnect transfer line. Rinse with water (two times) into water rinse sample bottle. Rinse with acetone (one time) and hexane (two times) into the organic rinse sample bottle.

_____ Transfer water from knockout impinger to second impinger. Ensure that water level is at least 1 cm above stem tip. Add water if necessary.

Volume of water added: _____

_____ If all water in knockout impinger will not fit in second impinger, replace stem on knockout impinger. Ensure that the water level in the first impinger is at least 1 cm above stem tip. Add water if necessary.

Volume of water added: _____.

_____ Purge with nitrogen for one hour at >14 liters per minute. Record start and end times on the data sheet.

Start _____ Stop _____

_____ Separate filter holder and place filter in clean pre-rinsed glass petri dish. Complete Filt sample label.

_____ Rinse front half of filter holder with acetone (three times) into PNR bottle. Complete probe and nozzle rinse (PNR) sample label.

_____ Rinse the back half of the filter holder and any connecting glassware with water (two times) into the water rinse sample bottle.

_____ Rinse the back half of the filter holder and any connecting glassware with acetone (one time) and with hexane (two times) into the organic rinse sample bottle.

_____ Separate CPM filter holder and place CPM filter in clean pre-rinsed glass petri dish. Complete CPM-Filt sample label.

_____ Disassemble sample train, wipe off excess water and weigh each impinger. Record the final weights in the Moisture Determination section of this data sheet

Note condition of the silica gel impinger. ____% spent

_____ Pour the contents of the first two impingers into the water rinse catch bottle(s). Rinse impingers, connecting glassware. And the front half of the CPM filter holder two times with water into the same bottles. Complete water rinse sample label.

_____ Rinse the first two impingers, connecting glassware, and the front half of the CPM filter holder acetone (one time) and hexane (two times) into the organic rinse sample bottle(s)

_____ Log samples into logbook and store appropriately.

Notes:

Project Name: GCO Stack Tests

Project Number: 60503939

Date: 5/9/17

Source: ByPass Vent Stack #5

Particulate Matter (incl. Condensable)
EPA Method 5/202

Condition No. _____

Run No. 3

Balance ID _____

Recovered by JC

Moisture Determination

Imp No.	Contents	Vol (mL)	Configuration	Initial Wt (g)	Final Wt (g)
1	empty		K/O	369.4	509.9
2	empty		Mod	607.7	620.4
3	Water	100	Mod	756.1	786.2
4	Silica Gel	~300g	Mod	796.5	818.5
5					

Filter

Filter ID Number	

Sample Log

Sample ID Number	Sample Container	Description
-M5/202-PNR	250 ml	Probe and Nozzle Rinse
-M5/202-Filt	Petri Dish	Filter
-M5/202-WtRns	1000 ml	Water Rinse
-M5/202-OrgRns	250 ml	Organic Rinse
-M5/202-CPMFilt	Petri Dish	CPM Filter

Sample Recovery Checklist

_____ Rinse and brush probe and nozzle with acetone (three times) into PNR sample bottle.

_____ Disconnect transfer line. Rinse with water (two times) into water rinse sample bottle. Rinse with acetone (one time) and hexane (two times) into the organic rinse sample bottle.

_____ Transfer water from knockout impinger to second impinger. Ensure that water level is at least 1 cm above stem tip. Add water if necessary.

Volume of water added: _____

_____ If all water in knockout impinger will not fit in second impinger, replace stem on knockout impinger. Ensure that the water level in the first impinger is at least 1 cm above stem tip. Add water if necessary.

Volume of water added: _____.

_____ Purge with nitrogen for one hour at >14 liters per minute. Record start and end times on the data sheet.

Start _____ Stop _____

_____ Separate filter holder and place filter in clean pre-rinsed glass petri dish. Complete Filt sample label.

_____ Rinse front half of filter holder with acetone (three times) into PNR bottle. Complete probe and nozzle rinse (PNR) sample label.

_____ Rinse the back half of the filter holder and any connecting glassware with water (two times) into the water rinse sample bottle.

_____ Rinse the back half of the filter holder and any connecting glassware with acetone (one time) and with hexane (two times) into the organic rinse sample bottle.

_____ Separate CPM filter holder and place CPM filter in clean pre-rinsed glass petri dish. Complete CPM-Filt sample label.

_____ Disassemble sample train, wipe off excess water and weigh each impinger. Record the final weights in the Moisture Determination section of this data sheet

Note condition of the silica gel impinger. ____% spent

_____ Pour the contents of the first two impingers into the water rinse catch bottle(s). Rinse impingers, connecting glassware. And the front half of the CPM filter holder two times with water into the same bottles. Complete water rinse sample label.

_____ Rinse the first two impingers, connecting glassware, and the front half of the CPM filter holder acetone (one time) and hexane (two times) into the organic rinse sample bottle(s)

_____ Log samples into logbook and store appropriately.

Notes:

RDS-47 - PM and Condensables by EPA Method 5/202
Per: EM SOP-047
Revision Date: March 2015

Sample Type: Multi Metals (Method 29)	Date: 5/8/17	Nozzle Dia (in): 0.375	Page: 1 of 1		
Project Name: GCO Stack Tests	Cond	Run: 1	Barometer ID: Weather Channel	Train Leak Rate (cfm @ "Hg)	
Project Number: 60542107	Console ID: URS-~~001~~ 005		Bar. Press. ("Hg): 30.03	Initial: 0.005 @ 13"	
Facility: SunCoke Energy GCO	ΔH@ ~~2.015~~ 1.947		Stat. Press. ("H_2O): -0.25	Final: 0.008 @ 11.0	
Source: ByPass Vent Stack #5	K_f: 5.52		Probe ID: 1704521	Pitot Tube Leak Check ("H_2O@"H_2O)	
Operator: JMF WCT/HO/SP	DGMCF: ~~0.970~~ 0.981		Pitot ID:	Initial (-): 0.0 @ 3.6	
Duct Dimension(s): 9'			PTCF: 0.83	Initial (+): 0.0 @ 3.8	
Nozzle Calibration: 0.375 / 0.375 / 0.375			Meter Elevation (ft) (relative to Barometer): 450	Final (-): ✓ @ 4	
Caliper ID:				Final (+): ✓ @ 4	

Point	Clock Time	DGM Reading (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F) Stack	Probe Target 248±25	Filter Target 248±25	Imp Exit Target <68	DGM Outlet	Vacuum ("Hg)
~~DC~~ C12	13:25	550.215	0.27	1.40	1303		255	60	93	7.5
C12	13:~~30~~ 28:30	552.518	Pause - lost power. Liner broke when blowers lost							
~~C10~~	13:35	JMF 5/8/17				power. Replaced liner. New leak v: 0.003@15.0				
~~C9~~	13:40									
JMF C12	15:10:30	554.070	0.27	1.4	1275		240	67	83	7.5
C11	15:~~1~~2	JMF 555.86	0.30	1.7	1276		246	67	83	8.0
C10	15:~~1~~87	JMF 558.77	0.29	1.6	1276		252	66	83	8.0
C9	15 22	562.51	0.29	1.6	1285		265	62	84	8.0
C8	1527	566.25	0.31	1.7	1283	JMF ~~102~~ 260		62	84	8.0
C7	1532	570.11	0.30	1.7	1287		257	59	84	8.0
C6	1537	574.08	0.27	1.5	1308		258	61	85	8.0
C5	1542	577.60	0.23	1.3	1358		257	61	85	6.5
C4	1547	581.16	0.17	0.93	1349		250	64	86	4.5
C3	1552	584.09	0.16	0.88	1330	TC	254	61	87	4.0
C2	1557	586.85	0.13	0.70	1275	~~1~~ 1	257	61	90	4.0
C1	1602	589.49	0.10	0.54	1060	out stack	255	65	92	3.5
END	1607	591.745								
			Leak v = 0.003 @ 16.0							
D1	1649	592.000	0.22	1.2	1177		255	61	99	7.0
D2	1654	595.27	0.23	1.3	1180		253	59	100	7.0
D3	1659	598.70	0.24	1.3	1197		252	63	101	7.0
D4	1704	602.15	0.25	1.4	1216		260	63	102	8.0
D5	1709	605.82	0.25	1.4	1236		256	64	103	8.5
D6	1714	609.37	0.25	1.4	1242		258	63	105	8.5
D7	1719	613.08	0.30	1.7	1273		257	63	107	10.0
D8	1724	616.71	0.29	1.6	1282		257	62	108	9.5
D9	1729	620.58	0.30	1.7	1297		257	63	108	10.0
D10	1734	624.52	0.30	1.7	1310		257	63	109	10.0
D11	1739	628.49	0.32	1.8	1300		256	63	109	10.0
D12	1744	632.53	0.32	1.8	1317		255	65	109	10.0

Notes: Point 12 = Probe all the way in stack.

* END 1749 636.588

Potential teflon shavings in sample.

Sample Type: **Multi Metals (Method 29)**	Date: 5/8/2017	Nozzle Dia (in): 0.375	Page: 1 of 1		
Project Name: **GCO Stack Tests**	Cond	Run 2	Barometer ID: WC	Train Leak Rate (cfm @ "Hg)	
Project Number: **60542107**	Console ID: Oak Ridge - URS-005		Bar. Press. ("Hg): 29.92	Initial: 0.008 @ 12.5	
Facility: **SunCoke Energy GCO**	ΔH@: 1.947		Stat. Press. ("H_2O): -0.25	Final: 0.0 @ 17"	
Source: **ByPass Vent Stack #5**	K_F: 5.53		Probe ID: 1704521	Pitot Tube Leak Check ("H_2O@"H_2O)	
Operator: JMF	DGMCF: 0.981		Pitot ID:	Initial (-): ✓ @ 4	
Duct Dimension(s): 9'			PTCF: 0.83	Initial (+): ✓ @ 4	
Nozzle Calibration			Meter Elevation (ft) (relative to Barometer): 450	Final (-): ✓ @ 4	
Caliper ID:				Final (+): ✓ @ 4	

Point	Clock Time	DGM Reading (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F)					Vacuum ("Hg)
					Stack	Probe Target 248±25	Filter Target 248±25	Imp Exit Target <68	DGM Outlet	
d1	21:25	638.145	0.10	0.56	726	Error	251	58	78	2.0
d2	21:30	640.35	0.11	0.88	1107	Out of Tank	257	54	78	3.0
d3	21:35	643.06	0.22	1.40	1162		256	53	78	5.5
d4	21:40	646.42	0.25	1.60	1202		258	56	78	6.5
d5	21:45	650.07	0.20	1.20	1250		254	57	78	7.0
d6	21:50	653.47	0.22	1.40	1318		255	57	78	6.0
d7	21:55	656.88	0.26	1.60	1262		254	58	78	6.5
d8	22:00	660.72	0.19	1.10	1297		257	59	78	4.5
d9	22:05	663.66	0.21	1.10	1354		254	59	78	5.0
d10	22:10	666.73	0.10	0.58	1368		255	59	77	2.5
d11	22:15	669.08	0.10	0.58	1390		255	58	79	3.0
d12	22:20	671.34	0.30	1.70	1472		258	57	80	8.0
END	22:25	674.889	—	Leak ✓ = ~~N~~ JMF 0.008 @ 12.5						
C12	00:07	675.148	0.28	1.60	1369		257	63	76	8.0
C11	00:12	678.88	0.27	1.50	1381		264	55	76	8.0
C10	00:17	682.34	0.22	1.20	1380		261	56	77	6.5
C9	00:22	685.63	0.23	1.30	1384		259	56	78	7.5
C8	00:27	687.28	0.23	1.30	1400		254	59	78	7.5
C7	00:32	689.98	0.30	1.60	1409		258	57	79	8.0
C6	00:37	693.67	0.34	1.80	1517		261	59	80	10.0
C5	00:42	697.53	0.34	1.80	1514		259	60	81	10.0
C4	00:47	701.43	0.34	1.80	1513		253	61	81	14.0
C3	00:52	704.41	0.36	1.90	1506		255	62	81	10.5
C2	00:57	708.35	0.35	1.90	1502		254	63	82	10.5
C1	01:02	712.36	0.25	1.40	1310		251	63	82	8.0
END	01:07	715.954	—							

Notes: Nozzle broke at port change. Had to replace liner / Nozzle

Potentially teflon shavings in sample. Brush shaved against Broken liner.

Sample Type	Multi Metals (Method 29)	Date	5/9/17	Nozzle Dia (in)	0.375	Page	1 of
Project Name	GCO Stack Tests	Cond	Run 3	Barometer ID	Weather Channel	Train Leak Rate (cfm @ "Hg)	
Project Number	60542107	Console ID	URS-005	Bar. Press. ("Hg)	29.89	Initial	0.01 @ 15"
Facility	SunCoke Energy GCO	ΔH@	1.947	Stat. Press. ("H_2O)	-0.25	Final	0.01 @ 12
Source	ByPass Vent Stack #5	K_f		Probe ID	1704521	Pitot Tube Leak Check ("H_2O@"H_2O)	
Operator	FC-HO	DGMCF	0.981	Pitot ID		Initial (-)	✓ @ 4"
Duct Dimension(s)				PTCF	0.83	Initial (+)	✓ @ 4"
Nozzle Calibration				Meter Elevation (ft) (relative to Barometer)	450	Final (-)	✓ @ 4
Caliper ID						Final (+)	✓ @ 4"

Point	Clock Time	DGM Reading (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F)					Vacuum ("Hg)
					Stack	Probe Target 248±25	Filter Target 248±25	Imp Exit Target <68	DGM Outlet	
~~—~~	~~0~~	~~719.753~~	~~0.26~~	~~1.4~~	~~1313~~			~~54~~	~~94~~	
~~C12~~	~~0~~	~~722.763~~	~~0.26~~	~~1.40~~						
C12	0	724.490	0.26	1.4	1315	N/A	251	64	95	3
11	5	728.13	0.28	1.50	1316	-	258	64	95	3
10	10	731.83	0.30	1.60	1308	-	260	64	96	3
9	15	735.52	0.29	1.60	1324	-	250	64	96	3
8	20	739.46	0.30	1.60	1331	-	260	64	96	3
7	25	743.38	0.31	1.70	1350	-	261	65	96	3
6	30	747.04	0.29	1.60	1394	-	260	65	96	3
5	35	750.69	0.31	1.70	1383	-	251	62	96	3
4	40	754.74	0.25	1.40	1384	-	260	63	97	3
3	45	758.31	0.25	1.30	1385	-	255	61	96	3
2	50	761.55	0.23	1.30	1370	-	257	62	96	3
1	55	765.05	0.20	1.10	1355	-	253	61	96	3
	60	768.269	-	-	-	-	-	-	-	-
D1	60	768.455	0.23	1.20	1230	-	231	67	94	3
2	65	771.93	0.23	1.20	1242	-	229	63	95	3
3	70	775.25	0.25	1.30	1258	-	230	64	96	3
4	75	778.67	0.25	1.30	1250	-	232	65	96	3
5	80	782.11	0.25	1.40	1262	-	231	62	96	3
6	85	785.73	0.28	1.50	1287	-	230	59	96	3
7	90	789.48	0.30	1.60	1300	-	228	58	97	3
8	95	793.16	0.30	1.60	1304	-	229	60	97	4
9	100	796.97	0.32	1.70	1338	-	233	60	97	4
10	105	801.01	0.35	1.80	1344	-	232	59	98	4
11	110	805.13	0.35	1.90	1344	-	233	61	98	4
12	115	809.02	0.37	2.00	1358	-	234	61	98	4
	120	813.250	-	END	RUN	-	-	-	-	-

Notes

Project Name	GCO Stack Tests
Project Number	60542107
Date	5/8/17
Source	ByPass Vent Stack #5

Multi-Metals
EPA Method 29
Including Determination of PM

Condition No.	
Run No.	1
Balance ID	
Recovered by	JC

Moisture Determination

Imp No.	Contents	Vol (mL)	Configuration	Initial Wt (g)	Final Wt (g)
1	-[1]	-	Mod		
2	HNO_3/H_2O_2	100	Mod	712.1	875.2
3	HNO_3/H_2O_2	100	G/S	692.2	707.0
4	Empty	-	Mod	627.7	629.3
5	$KMnO_4$ Soln	100	Mod	712.7	711.2
6	$KMnO_4$ Soln	100	Mod	717.7	719.6
7	Silica Gel	~ 300g	Mod	853.6	868.9

[1] Per the method, this first impinger is optional and may be excluded for sources with moisture catch anticipated to be less than 100 g (Section 8.1.3.2)

Sample Log

Sample ID Number	Sample Container	Description
-M5/29-PNR-Ace	250 mL	Probe and Nozzle Rinse - Acetone
-M5/29-PNR-NA	250 mL	Probe and Nozzle Rinse - Nitric Acid
-M5/29-Filt	Petri Dish	Filter
-M5/29-NPI	1 L	Nitric Peroxide Impinger
-M5/29-EIR	250 mL	Empty Impinger Rinse
-M5/29-Perm	1 L	Permanganate Impinger
-M5/29-HClRns	250 mL	HCl Rinse of $KMnO_4$ Impinger

Filter

Filter ID Number	

Sample Recovery Checklist

_____ Rinse and brush probe and nozzle with acetone into PNR-Ace bottle. Note – use teflon brush.

_____ Rinse and brush probe and nozzle with 0.1 M Nitric Acid into PNR-NA bottle. Note: use Teflon brush.

_____ Rinse the (optional) Teflon transfer line with 0.1M nitric acid into NPI bottle.

_____ Separate filter holder and place filter in clean petri dish. Complete sample label.

_____ Rinse front half of filter holder with acetone into PNR-Ace bottle. Complete PNR-Ace sample label.

_____ Rinse front half of filter holder with 0.1 M nitric acid into PNR-NA bottle. Complete PNR sample label.

_____ Disassemble sample train, wipe off excess water and weigh each impinger. Record the final weights in the Moisture Determination section.

Note condition of the silica gel impinger. _____% spent

_____ Pour contents of first 3 impingers into the Nitric/peroxide impinger (NPI) catch bottle(s) Rinse the impingers, filter support, back-half of the filter holder and connecting glassware with 0.1 M nitric acid same bottle(s). Complete NPI sample label(s).

_____ Rinse the 4th (initially empty) impinger with 0.1 M nitric acid into the empty impinger rinse (EIR) bottle. Complete EIR sample label.

_____ Pour the contents of the 5th and 6th impingers (permanganate impingers) into the permanganate impinger catch bottle (Perm). Rinse with both permanganate solution and DI water. Complete Perm sample label

_____ Rinse the permanganate impingers with a total of 25 mL of 8N HCl into the same bottle. Rinse impingers with 200 ml DI water into the same bottle. Complete HClRns sample label. (Note, this is not required if there is no visible solid residue)

_____ Log samples into logbook and store appropriately.

Notes:

Project Name	GCO Stack Tests
Project Number	60542107
Date	
Source	ByPass Vent Stack #5

Multi-Metals
EPA Method 29
Including Determination of PM

Condition No.	
Run No.	2
Balance ID	
Recovered by	JC

Moisture Determination

Imp No.	Contents	Vol (mL)	Configuration	Initial Wt (g)	Final Wt (g)
1	-[1]	-	Mod		
2	HNO_3/H_2O_2	100	Mod	707.9	897.2
3	HNO_3/H_2O_2	100	G/S	700.1	712.9
4	Empty	-	Mod	603.0	604.5
5	$KMnO_4$ Soln	100	Mod	714.6	713.7
6	$KMnO_4$ Soln	100	Mod	714.5	714.6
7	Silica Gel	~ 300g	Mod	840.8	856.5

[1] Per the method, this first impinger is optional and may be excluded for sources with moisture catch anticipated to be less than 100 g (Section 8.1.3.2)

Sample Log

Sample ID Number	Sample Container	Description
-M5/29-PNR-Ace	250 mL	Probe and Nozzle Rinse - Acetone
-M5/29-PNR-NA	250 mL	Probe and Nozzle Rinse - Nitric Acid
-M5/29-Filt	Petri Dish	Filter
-M5/29-NPI	1 L	Nitric Peroxide Impinger
-M5/29-EIR	250 mL	Empty Impinger Rinse
-M5/29-Perm	1 L	Permanganate Impinger
-M5/29-HClRns	250 mL	HCl Rinse of $KMnO_4$ Impinger

Filter

Filter ID Number	

Sample Recovery Checklist

_____ Rinse and brush probe and nozzle with acetone into PNR-Ace bottle. Note – use teflon brush.

_____ Rinse and brush probe and nozzle with 0.1 M Nitric Acid into PNR-NA bottle. Note: use Teflon brush.

_____ Rinse the (optional) Teflon transfer line with 0.1M nitric acid into NPI bottle.

_____ Separate filter holder and place filter in clean petri dish. Complete sample label.

_____ Rinse front half of filter holder with acetone into PNR-Ace bottle. Complete PNR-Ace sample label.

_____ Rinse front half of filter holder with 0.1 M nitric acid into PNR-NA bottle. Complete PNR sample label.

_____ Disassemble sample train, wipe off excess water and weigh each impinger. Record the final weights in the Moisture Determination section.

Note condition of the silica gel impinger. _____% spent

_____ Pour contents of first 3 impingers into the Nitric/peroxide impinger (NPI) catch bottle(s) Rinse the impingers, filter support, back-half of the filter holder and connecting glassware with 0.1 M nitric acid same bottle(s). Complete NPI sample label(s).

_____ Rinse the 4th (initially empty) impinger with 0.1 M nitric acid into the empty impinger rinse (EIR) bottle. Complete EIR sample label.

_____ Pour the contents of the 5th and 6th impingers (permanganate impingers) into the permanganate impinger catch bottle (Perm). Rinse with both permanganate solution and DI water. Complete Perm sample label

_____ Rinse the permanganate impingers with a total of 25 mL of 8N HCl into the same bottle. Rinse impingers with 200 ml DI water into the same bottle. Complete HClRns sample label. (Note, this is not required if there is no visible solid residue)

_____ Log samples into logbook and store appropriately.

Notes:

Project Name	GCO Stack Tests
Project Number	60542107
Date	5/9/17
Source	ByPass Vent Stack #5

Multi-Metals
EPA Method 29
Including Determination of PM

Condition No.	
Run No.	3
Balance ID	
Recovered by	JC

Moisture Determination

Imp No.	Contents	Vol (mL)	Configuration	Initial Wt (g)	Final Wt (g)
1	-[1]	-	Mod		
2	HNO_3/H_2O_2	100	Mod	711.3	892.5
3	HNO_3/H_2O_2	100	G/S	703.9	718.7
4	Empty	-	Mod	606.9	608.3
5	$KMnO_4$ Soln	100	Mod	712.9	719.2
6	$KMnO_4$ Soln	100	Mod	717.9	713.5
7	Silica Gel	~ 300g	Mod	822.2	838.0

[1] Per the method, this first impinger is optional and may be excluded for sources with moisture catch anticipated to be less than 100 g (Section 8.1.3.2)

Sample Log

Sample ID Number	Sample Container	Description
-M5/29-PNR-Ace	250 mL	Probe and Nozzle Rinse - Acetone
-M5/29-PNR-NA	250 mL	Probe and Nozzle Rinse - Nitric Acid
-M5/29-Filt	Petri Dish	Filter
-M5/29-NPI	1 L	Nitric Peroxide Impinger
-M5/29-EIR	250 mL	Empty Impinger Rinse
-M5/29-Perm	1 L	Permanganate Impinger
-M5/29-HClRns	250 mL	HCl Rinse of $KMnO_4$ Impinger

Filter

Filter ID Number	

Sample Recovery Checklist

_____ Rinse and brush probe and nozzle with acetone into PNR-Ace bottle. Note – use teflon brush.

_____ Rinse and brush probe and nozzle with 0.1 M Nitric Acid into PNR-NA bottle. Note: use Teflon brush.

_____ Rinse the (optional) Teflon transfer line with 0.1M nitric acid into NPI bottle.

_____ Separate filter holder and place filter in clean petri dish. Complete sample label.

_____ Rinse front half of filter holder with acetone into PNR-Ace bottle. Complete PNR-Ace sample label.

_____ Rinse front half of filter holder with 0.1 M nitric acid into PNR-NA bottle. Complete PNR sample label.

_____ Disassemble sample train, wipe off excess water and weigh each impinger. Record the final weights in the Moisture Determination section.

Note condition of the silica gel impinger. _____% spent

_____ Pour contents of first 3 impingers into the Nitric/peroxide impinger (NPI) catch bottle(s). Rinse the impingers, filter support, back-half of the filter holder and connecting glassware with 0.1 M nitric acid same bottle(s). Complete NPI sample label(s).

_____ Rinse the 4th (initially empty) impinger with 0.1 M nitric acid into the empty impinger rinse (EIR) bottle. Complete EIR sample label.

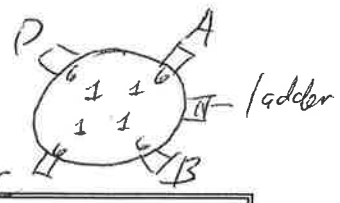
_____ Pour the contents of the 5th and 6th impingers (permanganate impingers) into the permanganate impinger catch bottle (Perm). Rinse with both permanganate solution and DI water. Complete Perm sample label

_____ Rinse the permanganate impingers with a total of 25 mL of 8N HCl into the same bottle. Rinse impingers with 200 ml DI water into the same bottle. Complete HClRns sample label. (Note, this is not required if there is no visible solid residue)

_____ Log samples into logbook and store appropriately.

Notes:

Determination of Cyclonic Flow
Preliminary Velocity/Temperature Traverse
EPA Methods 1 and 2



Project	GCO FCR Tests
Project Number	605-42107
Facility	GCO
Source	HRSG #5 Stack
Operator	WCT / SP
Date	5/2/17
Time	
Pitot Tube No.	
PTCF	

Console (or Temperature Readout) ID	
Barometric Pressure (" Hg)	
Elevation (Relative to Barometer) (ft)	
Static Pressure (" wc)	-0.31

Pitot Tube Leak Check ("H_2O@"H_2O)			
Initial (-)	✓	@	5
Initial (+)	✓	@	5
Final (-)	✓	@	6
Final (+)	✓	@	5

Traverse Point	Yaw Angle (°)	Velocity Head (ΔP) (in. wc)	Temperature (°F)
A 1	-10.5	0.26	1390
2	-17	0.18	1391
3	-16	0.23	1403
4	-20	0.27	1399
5	-21	0.20	1392
6	-16	0.17	1384
B 1	-18	0.30	
2	-15	0.31	1375
3	-20	0.32	1415
4	-24	0.29	1430
5	-18	0.26	1441
6	-17	0.24	1435

Traverse Point	Yaw Angle (°)	Velocity Head (ΔP) (in. wc)	Temperature (°F)
C 1	-3	0.28	~~13~~
2	-10	0.29	1368
3	-17	0.26	1385
4	-16	0.27	1391
5	-22	0.24	1384
6	-24	0.22	1387
D 1	-13.5	2.29	1350
2	-20	0.28	1350
3	-21	0.26	1352
4	-21.5	0.22	1355
5	-25	0.23	1358
6	-16	0.18	

Average Yaw Angle: 17.6 .(This is the average of the absolute value of the measurements)

If the average yaw angle exceeds 20°, Method 2 is not applicable for the determination of gas velocity.

Appendix D
ANALYTICAL REPORTS

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 140-8122-1

Job Description: Suncoke - M5/M202

For:
URS Corporation
105 Mitchell Road, Suite 200
Oak Ridge, TN 37830

Attention: John Carson

Approved for release.
Courtney M Adkins
Project Manager I
5/30/2017 12:18 PM

Courtney M Adkins, Project Manager I
5815 Middlebrook Pike, Knoxville, TN, 37921
(865)291-3000
courtney.adkins@testamericainc.com
05/30/2017

Table of Contents

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: URS Corporation
Project/Site: Suncoke - M5/M202

TestAmerica Job ID: 140-8122-1

Method	Method Description	Protocol	Laboratory
202 InOrg CPM	Inorganic Condensable Particulate Matter	EPA	TAL KNX
202 Org CPM	Organic Condensable Particulate Matter	EPA	TAL KNX
5	Particulates	EPA	TAL KNX

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Sample Summary

Client: URS Corporation
Project/Site: Suncoke - M5/M202

TestAmerica Job ID: 140-8122-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
140-8122-1	R-2434 R1 M5 PARTICULATE FILTER	Air	05/10/17 00:00	05/16/17 13:05
140-8122-2	R-2435 R1 M5 ACETONE PROBE RINSE	Air	05/10/17 00:00	05/16/17 13:05
140-8122-3	R-2436 R1 M202 AQUEOUS FRACTION	Air	05/10/17 00:00	05/16/17 13:05
140-8122-4	R-2437 R1 M202 ACETONE/HEXANE ORGANIC FRACTION	Air	05/10/17 00:00	05/16/17 13:05
140-8122-6	R-2479 R2 M5 PARTICULATE FILTER	Air	05/10/17 00:00	05/16/17 13:05
140-8122-7	R-2480 R2 M5 ACETONE PROBE RINSE	Air	05/10/17 00:00	05/16/17 13:05
140-8122-8	R-2481 R2 M202 AQUEOUS FRACTION	Air	05/10/17 00:00	05/16/17 13:05
140-8122-9	R-2482 R2 M202 ACETONE/HEXANE ORGANIC FRACTION	Air	05/10/17 00:00	05/16/17 13:05
140-8122-11	R-2524 R3 M5 PARTICULATE FILTER	Air	05/11/17 00:00	05/16/17 13:05
140-8122-12	R-2525 R3 M5 ACETONE PROBE RINSE	Air	05/11/17 00:00	05/16/17 13:05
140-8122-13	R-2526 R3 M202 AQUEOUS FRACTION	Air	05/11/17 00:00	05/16/17 13:05
140-8122-14	R-2527 R3 M202 ACETONE/HEXANE ORGANIC FRACTION	Air	05/11/17 00:00	05/16/17 13:05
140-8122-16	R-2597 QC M5 PARTICULATE FILTER PB	Air	05/07/17 00:00	05/16/17 13:05
140-8122-17	R-2599 QC ACETONE/HEXANE PB	Air	05/07/17 00:00	05/16/17 13:05
140-8122-18	R-2600 QC M202 DI WATER PB	Air	05/07/17 00:00	05/16/17 13:05
140-8122-20	R-2601 QC M5/202 PARTICULATE FILTER RB	Air	05/09/17 00:00	05/16/17 13:05
140-8122-21	R-2602 QC M202 ACETONE RB	Air	05/11/17 00:00	05/16/17 13:05
140-8122-22	R-2603 QC M202 HEXANE RB	Air	05/11/17 00:00	05/16/17 13:05
140-8122-23	R-2604 QC M202 DI WATER RB	Air	05/11/17 00:00	05/16/17 13:05
140-8122-25	R-3001 QC M202 FB AQUEOUS FRACTION	Air	05/09/17 00:00	05/16/17 13:05
140-8122-26	R-3002 QC M202 FB ACETONE/HEXANE FRACTION	Air	05/09/17 00:00	05/16/17 13:05
140-8122-27	A-6253 MEDIA CHECK M5	Air	05/07/17 00:00	05/16/17 13:05

Job Narrative
140-8122-1

Sample Receipt

The samples were received on May 16, 2017 at 1:05 PM. The samples arrived in good condition and properly preserved. The temperature of the cooler at receipt was 22.0° C.

Quality Control and Data Interpretation

Unless otherwise noted, all holding times, and QC criteria were met and the test results shown in this report meet all applicable NELAC requirements.

General Chemistry

Total Particulates: The measurement of the mass of particulate matter trapped by the particulate filter and probe rinse derived from an M-5 sampling train was performed using SOP number KNOX-WC-0006 (based on EPA Methods 0050 and 5). Microfiber filters and 150 mL beakers are carefully inspected and tare weighed to constant weight. After sample collection, the filters are dried, and then carefully weighed to constant weight to determine the mass of particulate matter trapped on the filters. The acetone probe rinse solution is evaporated to dryness, and then weighed to constant weight to determine the total particulate mass collected in the rinse. The total particulate mass collected by an M-5 train is the sum of the particulate filter and the acetone probe rinse residue weights.

Particulate by Method 202 (December 2010): Samples derived from Method 202 require special handling. The CPE filters were extracted three times with water, which was then combined with the corresponding aqueous fraction. The filters were then extracted with hexane three times, and the extracts were combined with the solvent rinses. The aqueous fractions were then extracted three times with hexane, and the extracts were combined with the solvent rinses. The organic fractions, including the acetone and hexane reagent blanks, were air dried in a hood. The aqueous fractions, including the deionized water reagent blank, were simmered to near dryness, and then allowed to air dry.

Aqueous samples having a pH < 6 were reconstituted with boiled deionized water, and then titrated with 0.1N ammonium hydroxide to a pH 7 endpoint. The samples were again simmered to near dryness, and then allowed to air dry. Titration to a pH 7 endpoint was not required for samples with a pH of 6 or higher upon receipt. Where applicable, the contribution from added ammonia was calculated and subtracted from the residue weight to obtain the final result for the aqueous fractions.

Residual water from both the aqueous samples and the organic solvent samples were further air dried in a forced draft oven at 28°C before transferring them to a desiccator. The air dried samples were transferred to a desiccator and dried over calcium sulfate to constant weight.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry

Analysis Batch: 11400

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8122-3	R-2436 R1 M202 AQUEOUS FRACTION	Total/NA	Air	202 InOrg CPM	
140-8122-8	R-2481 R2 M202 AQUEOUS FRACTION	Total/NA	Air	202 InOrg CPM	
140-8122-13	R-2526 R3 M202 AQUEOUS FRACTION	Total/NA	Air	202 InOrg CPM	
140-8122-18	R-2600 QC M202 DI WATER PB	Total/NA	Air	202 InOrg CPM	
140-8122-23	R-2604 QC M202 DI WATER RB	Total/NA	Air	202 InOrg CPM	
140-8122-25	R-3001 QC M202 FB AQUEOUS FRACTION	Total/NA	Air	202 InOrg CPM	

Analysis Batch: 11401

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8122-4	R-2437 R1 M202 ACETONE/HEXANE ORGANIC	Total/NA	Air	202 Org CPM	
140-8122-9	R-2482 R2 M202 ACETONE/HEXANE ORGANIC	Total/NA	Air	202 Org CPM	
140-8122-14	R-2527 R3 M202 ACETONE/HEXANE ORGANIC	Total/NA	Air	202 Org CPM	
140-8122-17	R-2599 QC ACETONE/HEXANE PB	Total/NA	Air	202 Org CPM	
140-8122-21	R-2602 QC M202 ACETONE RB	Total/NA	Air	202 Org CPM	
140-8122-22	R-2603 QC M202 HEXANE RB	Total/NA	Air	202 Org CPM	
140-8122-26	R-3002 QC M202 FB ACETONE/HEXANE FRAC	Total/NA	Air	202 Org CPM	

Analysis Batch: 11467

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8122-1	R-2434 R1 M5 PARTICULATE FILTER	Total/NA	Air	5	
140-8122-2	R-2435 R1 M5 ACETONE PROBE RINSE	Total/NA	Air	5	
140-8122-6	R-2479 R2 M5 PARTICULATE FILTER	Total/NA	Air	5	
140-8122-7	R-2480 R2 M5 ACETONE PROBE RINSE	Total/NA	Air	5	
140-8122-11	R-2524 R3 M5 PARTICULATE FILTER	Total/NA	Air	5	
140-8122-12	R-2525 R3 M5 ACETONE PROBE RINSE	Total/NA	Air	5	
140-8122-16	R-2597 QC M5 PARTICULATE FILTER PB	Total/NA	Air	5	
140-8122-20	R-2601 QC M5/202 PARTICULATE FILTER RB	Total/NA	Air	5	
140-8122-27	A-6253 MEDIA CHECK M5	Total/NA	Air	5	

Client Sample ID: R-2434 R1 M5 PARTICULATE FILTER

Lab Sample ID: 140-8122-1
Matrix: Air
Date Collected: 05/10/17 00:00
Date Received: 05/16/17 13:05
Sample Container: Petri/Filter

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Particulates, Total	34.9		0.500	0.500	mg/sample			05/20/17 10:04	1

Client Sample ID: R-2435 R1 M5 ACETONE PROBE RINSE

Lab Sample ID: 140-8122-2
Matrix: Air
Date Collected: 05/10/17 00:00
Date Received: 05/16/17 13:05
Sample Container: Amber Glass 250ml - unpreserved

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Particulates, Total	8.01		0.500	0.500	mg/sample			05/20/17 10:04	1

Client Sample ID: R-2436 R1 M202 AQUEOUS FRACTION

Lab Sample ID: 140-8122-3
Matrix: Air
Date Collected: 05/10/17 00:00
Date Received: 05/16/17 13:05
Sample Container: Amber Glass 500mL - unpreserved

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Inorganic Condensible Particulate Matter	84.0		1.00	0.500	mg/sample			05/18/17 13:19	1

Client Sample ID: R-2437 R1 M202 ACETONE/HEXANE ORGANIC FRACTION

Lab Sample ID: 140-8122-4
Matrix: Air
Date Collected: 05/10/17 00:00
Date Received: 05/16/17 13:05
Sample Container: Amber Glass 500mL - unpreserved

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Organic Condensible Particulate Matter	2.48		1.00	0.500	mg/sample			05/18/17 13:27	1

Client Sample ID: R-2479 R2 M5 PARTICULATE FILTER

Lab Sample ID: 140-8122-6
Matrix: Air
Date Collected: 05/10/17 00:00
Date Received: 05/16/17 13:05
Sample Container: Petri/Filter

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Particulates, Total	80.4		0.500	0.500	mg/sample			05/20/17 10:04	1

Client Sample ID: R-2480 R2 M5 ACETONE PROBE RINSE

Lab Sample ID: 140-8122-7
Matrix: Air
Date Collected: 05/10/17 00:00
Date Received: 05/16/17 13:05
Sample Container: Amber Glass 250ml - unpreserved

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Particulates, Total	41.8		0.500	0.500	mg/sample			05/20/17 10:04	1

Client Sample ID: R-2481 R2 M202 AQUEOUS FRACTION

Lab Sample ID: 140-8122-8

Date Collected: 05/10/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Amber Glass 500mL - unpreserved

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Inorganic Condensible Particulate Matter	69.3		1.00	0.500	mg/sample			05/18/17 13:19	1

Client Sample ID: R-2482 R2 M202 ACETONE/HEXANE ORGANIC FRACTION

Lab Sample ID: 140-8122-9

Date Collected: 05/10/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Amber Glass 500mL - unpreserved

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Organic Condensible Particulate Matter	2.18		1.00	0.500	mg/sample			05/18/17 13:27	1

Client Sample ID: R-2524 R3 M5 PARTICULATE FILTER

Lab Sample ID: 140-8122-11

Date Collected: 05/11/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Petri/Filter

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Particulates, Total	35.7		0.500	0.500	mg/sample			05/20/17 10:04	1

Client Sample ID: R-2525 R3 M5 ACETONE PROBE RINSE

Lab Sample ID: 140-8122-12

Date Collected: 05/11/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Amber Glass 250ml - unpreserved

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Particulates, Total	20.6		0.500	0.500	mg/sample			05/20/17 10:04	1

Client Sample ID: R-2526 R3 M202 AQUEOUS FRACTION

Lab Sample ID: 140-8122-13

Date Collected: 05/11/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Amber Glass 500mL - unpreserved

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Inorganic Condensible Particulate Matter	49.2		1.00	0.500	mg/sample			05/18/17 13:19	1

Client Sample ID: R-2527 R3 M202 ACETONE/HEXANE ORGANIC FRACTION

Lab Sample ID: 140-8122-14

Date Collected: 05/11/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Amber Glass 500mL - unpreserved

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Organic Condensible Particulate Matter	1.89		1.00	0.500	mg/sample			05/18/17 13:27	1

Client Sample ID: R-2597 QC M5 PARTICULATE FILTER PB

Lab Sample ID: 140-8122-16

Date Collected: 05/07/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Petri/Filter

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Particulates, Total	ND		0.500	0.500	mg/sample			05/20/17 10:04	1

Client Sample ID: R-2599 QC ACETONE/HEXANE PB

Lab Sample ID: 140-8122-17

Date Collected: 05/07/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Amber Glass 500mL - unpreserved

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Organic Condensible Particulate Matter	1.56		1.00	0.500	mg/sample			05/18/17 13:27	1

Client Sample ID: R-2600 QC M202 DI WATER PB

Lab Sample ID: 140-8122-18

Date Collected: 05/07/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Amber Glass 500mL - unpreserved

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Inorganic Condensible Particulate Matter	3.46		1.00	0.500	mg/sample			05/18/17 13:19	1

Client Sample ID: R-2601 QC M5/202 PARTICULATE FILTER RB

Lab Sample ID: 140-8122-20

Date Collected: 05/09/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Petri/Filter

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Particulates, Total	ND		0.500	0.500	mg/sample			05/20/17 10:04	1

Client Sample ID: R-2602 QC M202 ACETONE RB

Lab Sample ID: 140-8122-21

Date Collected: 05/11/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Amber Glass 250ml - unpreserved

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Organic Condensible Particulate Matter	1.27		1.00	0.500	mg/sample			05/18/17 13:27	1

Client Sample ID: R-2603 QC M202 HEXANE RB

Lab Sample ID: 140-8122-22

Date Collected: 05/11/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Amber Glass 250ml - unpreserved

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Organic Condensible Particulate Matter	1.09		1.00	0.500	mg/sample			05/18/17 13:27	1

Client Sample ID: R-2604 QC M202 DI WATER RB

Lab Sample ID: 140-8122-23

Date Collected: 05/11/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Amber Glass 500mL - unpreserved

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Inorganic Condensible Particulate Matter	1.83		1.00	0.500	mg/sample			05/18/17 13:19	1

Client Sample ID: R-3001 QC M202 FB AQUEOUS FRACTION

Lab Sample ID: 140-8122-25

Date Collected: 05/09/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Amber Glass 500mL - unpreserved

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Inorganic Condensible Particulate Matter	2.80		1.00	0.500	mg/sample			05/18/17 13:19	1

Client Sample ID: R-3002 QC M202 FB ACETONE/HEXANE FRACTION

Lab Sample ID: 140-8122-26

Date Collected: 05/09/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Amber Glass 500mL - unpreserved

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Organic Condensible Particulate Matter	1.29		1.00	0.500	mg/sample			05/18/17 13:27	1

Client: URS Corporation
Project/Site: Suncoke - M5/M202

TestAmerica Job ID: 140-8122-1

Client Sample ID: A-6253 MEDIA CHECK M5
Lab Sample ID: 140-8122-27
Date Collected: 05/07/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Petri/Filter

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Particulates, Total	ND		0.500	0.500	mg/sample			05/20/17 10:04	1

Default Detection Limits

Client: URS Corporation
Project/Site: Suncoke - M5/M202

TestAmerica Job ID: 140-8122-1

General Chemistry

Analyte	RL	MDL	Units	Method
Inorganic Condensible Particulate Matter	1.00	0.500	mg/sample	202 InOrg CPM
Organic Condensible Particulate Matter	1.00	0.500	mg/sample	202 Org CPM
Particulates, Total	0.500	0.500	mg/sample	5

Client Sample ID: R-2434 R1 M5 PARTICULATE FILTER — Lab Sample ID: 140-8122-1

Date Collected: 05/10/17 00:00 — **Matrix: Air**
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	5		1			11467	05/20/17 10:04	TSN	TAL KNX
	Instrument ID: FT_Gross									

Client Sample ID: R-2435 R1 M5 ACETONE PROBE RINSE — Lab Sample ID: 140-8122-2

Date Collected: 05/10/17 00:00 — **Matrix: Air**
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	5		1			11467	05/20/17 10:04	TSN	TAL KNX
	Instrument ID: FT_Gross									

Client Sample ID: R-2436 R1 M202 AQUEOUS FRACTION — Lab Sample ID: 140-8122-3

Date Collected: 05/10/17 00:00 — **Matrix: Air**
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	202 InOrg CPM		1			11400	05/18/17 13:19	TSN	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: R-2437 R1 M202 ACETONE/HEXANE ORGANIC FRACTION — Lab Sample ID: 140-8122-4

Date Collected: 05/10/17 00:00 — **Matrix: Air**
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	202 Org CPM		1			11401	05/18/17 13:27	TSN	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: R-2479 R2 M5 PARTICULATE FILTER — Lab Sample ID: 140-8122-6

Date Collected: 05/10/17 00:00 — **Matrix: Air**
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	5		1			11467	05/20/17 10:04	TSN	TAL KNX
	Instrument ID: FT_Gross									

Client Sample ID: R-2480 R2 M5 ACETONE PROBE RINSE — Lab Sample ID: 140-8122-7

Date Collected: 05/10/17 00:00 — **Matrix: Air**
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	5		1			11467	05/20/17 10:04	TSN	TAL KNX

Client Sample ID: R-2480 R2 M5 ACETONE PROBE RINSE

Lab Sample ID: 140-8122-7
Matrix: Air
Date Collected: 05/10/17 00:00
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	5		1			11467	05/20/17 10:04	TSN	TAL KNX
	Instrument ID: FT_Gross									

Client Sample ID: R-2481 R2 M202 AQUEOUS FRACTION

Lab Sample ID: 140-8122-8
Matrix: Air
Date Collected: 05/10/17 00:00
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	202 InOrg CPM		1			11400	05/18/17 13:19	TSN	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: R-2482 R2 M202 ACETONE/HEXANE ORGANIC FRACTION

Lab Sample ID: 140-8122-9
Matrix: Air
Date Collected: 05/10/17 00:00
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	202 Org CPM		1			11401	05/18/17 13:27	TSN	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: R-2524 R3 M5 PARTICULATE FILTER

Lab Sample ID: 140-8122-11
Matrix: Air
Date Collected: 05/11/17 00:00
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	5		1			11467	05/20/17 10:04	TSN	TAL KNX
	Instrument ID: FT_Gross									

Client Sample ID: R-2525 R3 M5 ACETONE PROBE RINSE

Lab Sample ID: 140-8122-12
Matrix: Air
Date Collected: 05/11/17 00:00
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	5		1			11467	05/20/17 10:04	TSN	TAL KNX
	Instrument ID: FT_Gross									

Client Sample ID: R-2526 R3 M202 AQUEOUS FRACTION

Lab Sample ID: 140-8122-13
Matrix: Air
Date Collected: 05/11/17 00:00
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	202 InOrg CPM		1			11400	05/18/17 13:19	TSN	TAL KNX

Client Sample ID: R-2526 R3 M202 AQUEOUS FRACTION

Lab Sample ID: 140-8122-13

Date Collected: 05/11/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	202 InOrg CPM		1			11400	05/18/17 13:19	TSN	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: R-2527 R3 M202 ACETONE/HEXANE ORGANIC FRACTION

Lab Sample ID: 140-8122-14

Date Collected: 05/11/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	202 Org CPM		1			11401	05/18/17 13:27	TSN	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: R-2597 QC M5 PARTICULATE FILTER PB

Lab Sample ID: 140-8122-16

Date Collected: 05/07/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	5		1			11467	05/20/17 10:04	TSN	TAL KNX
	Instrument ID: FT_Gross									

Client Sample ID: R-2599 QC ACETONE/HEXANE PB

Lab Sample ID: 140-8122-17

Date Collected: 05/07/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	202 Org CPM		1			11401	05/18/17 13:27	TSN	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: R-2600 QC M202 DI WATER PB

Lab Sample ID: 140-8122-18

Date Collected: 05/07/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	202 InOrg CPM		1			11400	05/18/17 13:19	TSN	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: R-2601 QC M5/202 PARTICULATE FILTER RB

Lab Sample ID: 140-8122-20

Date Collected: 05/09/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	5		1			11467	05/20/17 10:04	TSN	TAL KNX
	Instrument ID: FT_Gross									

Client Sample ID: R-2602 QC M202 ACETONE RB

Lab Sample ID: 140-8122-21

Date Collected: 05/11/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	202 Org CPM		1			11401	05/18/17 13:27	TSN	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: R-2603 QC M202 HEXANE RB

Lab Sample ID: 140-8122-22

Date Collected: 05/11/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	202 Org CPM		1			11401	05/18/17 13:27	TSN	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: R-2604 QC M202 DI WATER RB

Lab Sample ID: 140-8122-23

Date Collected: 05/11/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	202 InOrg CPM		1			11400	05/18/17 13:19	TSN	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: R-3001 QC M202 FB AQUEOUS FRACTION

Lab Sample ID: 140-8122-25

Date Collected: 05/09/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	202 InOrg CPM		1			11400	05/18/17 13:19	TSN	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: R-3002 QC M202 FB ACETONE/HEXANE FRACTION

Lab Sample ID: 140-8122-26

Date Collected: 05/09/17 00:00
Date Received: 05/16/17 13:05

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	202 Org CPM		1			11401	05/18/17 13:27	TSN	TAL KNX
	Instrument ID: NOEQUIP									

Client Sample ID: A-6253 MEDIA CHECK M5

Lab Sample ID: 140-8122-27

Date Collected: 05/07/17 00:00
Date Received: 05/16/17 13:05

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	5		1			11467	05/20/17 10:04	TSN	TAL KNX
	Instrument ID: FT_Gross									

Laboratory References:

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Accreditation/Certification Summary

Client: URS Corporation
Project/Site: Suncoke - M5/M202

TestAmerica Job ID: 140-8122-1

Laboratory: TestAmerica Knoxville

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		N/A	
Arkansas DEQ	State Program	6	88-0688	06-16-17
California	State Program	9	2423	06-30-18
Colorado	State Program	8	TN00009	02-28-18
Connecticut	State Program	1	PH-0223	09-30-17
Florida	NELAP	4	E87177	06-30-17
Georgia	State Program	4	906	04-13-20
Hawaii	State Program	9	N/A	04-13-18
Kansas	NELAP	7	E-10349	10-31-17
Kentucky (DW)	State Program	4	90101	12-31-17
L-A-B	DoD ELAP		L2311	02-13-19
Louisiana	NELAP	6	83979	06-30-17
Louisiana (DW)	NELAP	6	LA160005	12-31-17
Maryland	State Program	3	277	03-31-18
Michigan	State Program	5	9933	04-13-17 *
Nevada	State Program	9	TN00009	07-31-17
New Jersey	NELAP	2	TN001	06-30-17
New York	NELAP	2	10781	03-31-18
North Carolina (DW)	State Program	4	21705	07-31-17
North Carolina (WW/SW)	State Program	4	64	12-31-17
Ohio VAP	State Program	5	CL0059	11-22-18
Oklahoma	State Program	6	9415	08-31-17
Pennsylvania	NELAP	3	68-00576	12-31-17
Tennessee	State Program	4	2014	04-13-20
Texas	NELAP	6	T104704380-16-9	08-31-17
USDA	Federal		P330-13-00262	08-20-19
Utah	NELAP	8	TN00009	07-31-17
Virginia	NELAP	3	460176	09-14-17
Washington	State Program	10	C593	01-19-18
West Virginia (DW)	State Program	3	9955C	12-31-17
West Virginia DEP	State Program	3	345	04-30-18
Wisconsin	State Program	5	998044300	08-31-17

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 140-8115-1

Job Description: Suncoke - M5/29

For:
URS Corporation
105 Mitchell Road, Suite 200
Oak Ridge, TN 37830

Attention: John Carson

Approved for release.
Courtney M Adkins
Project Manager I
7/6/2017 2:29 PM

Courtney M Adkins, Project Manager I
5815 Middlebrook Pike, Knoxville, TN, 37921
(865)291-3000
courtney.adkins@testamericainc.com
07/06/2017

Table of Contents

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Qualifiers

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
W	PS: Post-digestion spike was outside control limits
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
V	Serial Dilution exceeds the control limits

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: URS Corporation
Project/Site: Suncoke - M5/29

TestAmerica Job ID: 140-8115-1

Method	Method Description	Protocol	Laboratory
29/6020A	Metals (ICPMS), Stationary Source	EPA	TAL PIT
29/7470A	Mercury (CVAA), Stationary Source	EPA	TAL KNX
5	Particulates	EPA	TAL KNX

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Sample Summary

Client: URS Corporation
Project/Site: Suncoke - M5/29

TestAmerica Job ID: 140-8115-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
140-8115-1	R-2421 F2 R1 M5 FILTER	Air	05/08/17 00:00	05/16/17 13:05
140-8115-2	R-2422 F2 R1 M5 ACETONE	Air	05/08/17 00:00	05/16/17 13:05
140-8115-3	R-2421,2422,2423 F2 R1 M29 FH COMP	Air	05/08/17 00:00	05/16/17 13:05
140-8115-4	R-2424 F2 R1 M29 BH IMP	Air	05/08/17 00:00	05/16/17 13:05
140-8115-5	R-2425 F2 R1 M29 EMPTY IMP	Air	05/08/17 00:00	05/16/17 13:05
140-8115-6	R-2426 F2 R1 M29 KMNO4/H2SO4 IMP	Air	05/08/17 00:00	05/16/17 13:05
140-8115-7	R-2427 F2 R1 M29 HCL RINSE	Air	05/08/17 00:00	05/16/17 13:05
140-8115-8	R-2466 F2 R2 M5 FILTER	Air	05/08/17 00:00	05/16/17 13:05
140-8115-9	R-2467 F2 R2 M5 ACETONE	Air	05/08/17 00:00	05/16/17 13:05
140-8115-10	R-2466,2467,2468 F2 R2 M29 FH COMP	Air	05/08/17 00:00	05/16/17 13:05
140-8115-11	R-2469 F2 R2 M29 BH IMP	Air	05/08/17 00:00	05/16/17 13:05
140-8115-12	R-2470 F2 R2 M29 EMPTY IMP	Air	05/08/17 00:00	05/16/17 13:05
140-8115-13	R-2471 F2 R2 M29 KMNO4/H2SO4 IMP	Air	05/08/17 00:00	05/16/17 13:05
140-8115-14	R-2472 F2 R2 M29 HCL RINSE	Air	05/08/17 00:00	05/16/17 13:05
140-8115-15	R-2511 F2 R3 M5 FILTER	Air	05/09/17 00:00	05/16/17 13:05
140-8115-16	R-2512 F2 R3 M5 ACETONE	Air	05/09/17 00:00	05/16/17 13:05
140-8115-17	R-2511,2512,2513 F2 R3 M29 FH COMP	Air	05/09/17 00:00	05/16/17 13:05
140-8115-18	R-2514 F2 R3 M29 BH IMP	Air	05/09/17 00:00	05/16/17 13:05
140-8115-19	R-2515 F2 R3 M29 EMPTY IMP	Air	05/09/17 00:00	05/16/17 13:05
140-8115-20	R-2516 F2 R3 M29 KMNO4/H2SO4 IMP	Air	05/09/17 00:00	05/16/17 13:05
140-8115-21	R-2517 F2 R3 M29 HCL RINSE IMP	Air	05/09/17 00:00	05/16/17 13:05
140-8115-26	R-2535 F2 R4 M5 FILTER	Air	05/09/17 00:00	05/16/17 13:05
140-8115-27	R-2536 F2 R4 M5 ACETONE	Air	05/09/17 00:00	05/16/17 13:05
140-8115-28	R-2535,2536,2537 F2 R4 M29 FH COMP	Air	05/09/17 00:00	05/16/17 13:05
140-8115-29	R-2538 F2 R4 M29 BH IMP	Air	05/09/17 00:00	05/16/17 13:05
140-8115-30	R-2539 F2 R4 M29 EMPTY IMP	Air	05/09/17 00:00	05/16/17 13:05
140-8115-31	R-2540 F2 R4 M29 KMNO4/H2SO4 IMP	Air	05/09/17 00:00	05/16/17 13:05
140-8115-32	R-2541 F2 R4 M29 HCL RINSE	Air	05/09/17 00:00	05/16/17 13:05
140-8115-33	R-2542 F2 R5 M5 FILTER	Air	05/10/17 00:00	05/16/17 13:05
140-8115-34	R-2543 F2 R5 M5 ACETONE	Air	05/10/17 00:00	05/16/17 13:05
140-8115-35	R-2542,2543,2544 F2 R5 M29 FH COMP	Air	05/10/17 00:00	05/16/17 13:05
140-8115-36	R-2545 F2 R5 M29 BH IMP	Air	05/10/17 00:00	05/16/17 13:05
140-8115-37	R-2546 F2 R5 M29 EMPTY IMP	Air	05/10/17 00:00	05/16/17 13:05
140-8115-38	R-2547 F2 R5 M29 KMNO4/H2SO4 IMP	Air	05/10/17 00:00	05/16/17 13:05
140-8115-39	R-2548 F2 R5 M29 HCL RINSE	Air	05/10/17 00:00	05/16/17 13:05
140-8115-40	R-2549 F2 R6 M5 FILTER	Air	05/11/17 00:00	05/16/17 13:05
140-8115-41	R-2550 F2 R6 M5 ACETONE	Air	05/11/17 00:00	05/16/17 13:05
140-8115-42	R-2549,2550,2551 F2 R6 M29 FH COMP	Air	05/11/17 00:00	05/16/17 13:05
140-8115-43	R-2552 F2 R6 M29 BH IMP	Air	05/11/17 00:00	05/16/17 13:05
140-8115-44	R-2553 F2 R6 M29 EMPTY IMP	Air	05/11/17 00:00	05/16/17 13:05
140-8115-45	R-2554 F2 R6 M29 KMNO4 IMP	Air	05/11/17 00:00	05/16/17 13:05
140-8115-46	R-2555 F2 R6 M29 HCL RINSE	Air	05/11/17 00:00	05/16/17 13:05
140-8115-49	R-2617 F2 QC M5 FILTER RB #2	Air	05/11/17 00:00	05/16/17 13:05
140-8115-50	R-2618 F2 QC M5 ACETONE RB #2	Air	05/11/17 00:00	05/16/17 13:05
140-8115-51	R-2617,2618,2619 F2 QC M29 FH COMP RB #2	Air	05/11/17 00:00	05/16/17 13:05
140-8115-52	R-2620 F2 QC M29 BH IMP RB #2	Air	05/11/17 00:00	05/16/17 13:05
140-8115-53	R-2622 F2 QC M29 KMNO4/H2SO4 IMP RB #2	Air	05/11/17 00:00	05/16/17 13:05
140-8115-54	R-2623 F2 QC M29 HCL RINSE RB #2	Air	05/11/17 00:00	05/16/17 13:05
140-8115-55	A-6252 MEDIA CHECK FILTER	Air	05/08/17 00:00	05/16/17 13:05

Not part of tests

Job Narrative
140-8115-1

Sample Receipt

The samples were received on May 16, 2017 at 1:05 PM in good condition and properly preserved. The temperature of the cooler at receipt was 22.0° C.

Quality Control and Data Interpretation

Unless otherwise noted, all holding times, and QC criteria were met and the test results shown in this report meet all applicable NELAC requirements.

Metals

Multi-Metals Train Preparation and Analysis

These stack gas samples were prepared and analyzed using TestAmerica Knoxville standard operating procedure KNOX-MT-0006 which is based on EPA SW-846 Method 0060, "Determination of Metals in Stack Emissions" and Method 29, "Determination of Metals Emissions from Stationary Sources". SW-846 7470A as incorporated in TestAmerica Knoxville standard operating procedure KNOX-MT-0009 was used to perform the final instrument analysis for mercury. A portion of the sample digestates were sent to TestAmerica Pittsburgh for ICPMS analysis by SW-846 method 6020A.

Acid digestion was performed on the front half particulate filter and the acetone and nitric acid probe rinse fractions separately using HNO3 and HF. After digestion, the HF was sequestered using H3BO3 followed by another heating cycle. These digestates were combined, adjusted to final volume and analyzed by ICPMS. A portion of the ICPMS digestate was prepared for CVAA analysis in order to determine the particle-bound mercury. Results were calculated using the following equations:

ICPMS Analyte, µg/sample = (Raw Sample Concentration, µg/L) x (Bench DF) x (Final Volume ICPMS Digestate, L)

Hg, µg/sample = (Raw Sample Concentration, µg/L) x (Bench DF) x (Final Volume ICPMS Digestate, L) x (Final Volume Hg Digestate, mL / Volume ICPMS Digestate Used, mL)

The 5%HNO3/10%H2O2 impinger samples were reduced in volume to 100 mL. A 20 milliliter portion of the concentrated sample was removed and processed for mercury. The remaining 80 mL of concentrated sample was digested using HNO3 and H2O2, adjusted to a final volume of 80 mL, and analyzed by ICPMS. Results were calculated using the following equations:

ICPMS Analyte, µg/sample = (Raw Sample Concentration, µg/L) x (Bench DF) x (Final Volume Concentrated Sample, L) x (Final Volume ICPMS Digestate, mL / Volume Concentrated Sample Digested, mL)

Hg, µg/sample = (Raw Sample Concentration, µg/L) x (Bench DF) x (Final Volume Concentrated Sample, L) x (Final Volume Hg Digestate, mL / Volume Concentrated Sample Digested, mL)

For the 0.1N HNO3 rinse samples (empty impingers), a 2.5 milliliter portion of the sample as received was removed and processed for mercury.

The 4% KMnO4/10%H2SO4 impinger samples were filtered to remove MnO2, followed by removal of a 25 mL portion of filtrate for mercury processing. The filtered MnO2 residue was digested in HCl, combined with the HCl rinse sample and analyzed for mercury.

Results for the 0.1N HNO3 rinse samples and the KMnO4 filtrate were calculated using the following equation:

Hg, µg/sample = (Raw Sample Concentration, µg/L) x (Bench DF) x (Total Sample Volume, L) x (Final Volume Hg Digestate, mL / Volume Sample Digested, mL)

Results for the combined MnO2 residue HCl digestates and HCl rinse samples were calculated as follows:

Hg, µg/sample = (Raw Sample Concentration, µg/L) x (Bench DF) x (Total Sample Volume, L + MnO2 HCl Volume, L) x (Final Volume Hg Digestate, mL / Volume Sample Digested, mL)

Note: The total sample volume for the 5%HNO3/10%H2O2 impinger samples is the final volume of the concentrated sample. The total sample volume for the combined MnO2 residue HCl digestates and HCl rinse samples is equal to the total sample volume plus the MnO2 HCl volume.

Method 29/6020A: The serial dilution performed for the following sample associated with batch 211848 was outside of the control limits for chromium and selenium.: R-2424 F2 R1 M29 BH IMP (140-8115-4)

Method 29/6020A: The post digestion duplicate spike % recovery for beryllium associated with batch 212181 was outside of the control

limits.

General Chemistry

Total Particulates: The measurement of the mass of particulate matter trapped by the particulate filter and probe rinse derived from an M-5 sampling train was performed using SOP number KNOX-WC-0006 (based on EPA Methods 0050 and 5). Microfiber filters and 150 mL beakers are carefully inspected and tare weighed to constant weight. After sample collection, the filters are dried, and then carefully weighed to constant weight to determine the mass of particulate matter trapped on the filters. The acetone probe rinse solution is evaporated to dryness, and then weighed to constant weight to determine the total particulate mass collected in the rinse. The total particulate mass collected by an M-5 train is the sum of the particulate filter and the acetone probe rinse residue weights.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals

Pre Prep Batch: 11528

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8115-6	R-2426 F2 R1 M29 KMNO4/H2SO4 IMP	Total/NA	Air	Air Train Vol.	
140-8115-13	R-2471 F2 R2 M29 KMNO4/H2SO4 IMP	Total/NA	Air	Air Train Vol.	
140-8115-20	R-2516 F2 R3 M29 KMNO4/H2SO4 IMP	Total/NA	Air	Air Train Vol.	
140-8115-31	R-2540 F2 R4 M29 KMNO4/H2SO4 IMP	Total/NA	Air	Air Train Vol.	
140-8115-38	R-2547 F2 R5 M29 KMNO4/H2SO4 IMP	Total/NA	Air	Air Train Vol.	
140-8115-45	R-2554 F2 R6 M29 KMNO4 IMP	Total/NA	Air	Air Train Vol.	
140-8115-53	R-2622 F2 QC M29 KMNO4/H2SO4 IMP RB #2	Total/NA	Air	Air Train Vol.	
MB 140-11528/10-B	Method Blank	Total/NA	Air	Air Train Vol.	
LCS 140-11528/11-B	Lab Control Sample	Total/NA	Air	Air Train Vol.	
140-8115-6 MS	R-2426 F2 R1 M29 KMNO4/H2SO4 IMP	Total/NA	Air	Air Train Vol.	
140-8115-6 MSD	R-2426 F2 R1 M29 KMNO4/H2SO4 IMP	Total/NA	Air	Air Train Vol.	

Prep Batch: 11529

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8115-6	R-2426 F2 R1 M29 KMNO4/H2SO4 IMP	Total/NA	Air	AT Prep (KMnO4)	11528
140-8115-13	R-2471 F2 R2 M29 KMNO4/H2SO4 IMP	Total/NA	Air	AT Prep (KMnO4)	11528
140-8115-20	R-2516 F2 R3 M29 KMNO4/H2SO4 IMP	Total/NA	Air	AT Prep (KMnO4)	11528
140-8115-31	R-2540 F2 R4 M29 KMNO4/H2SO4 IMP	Total/NA	Air	AT Prep (KMnO4)	11528
140-8115-38	R-2547 F2 R5 M29 KMNO4/H2SO4 IMP	Total/NA	Air	AT Prep (KMnO4)	11528
140-8115-45	R-2554 F2 R6 M29 KMNO4 IMP	Total/NA	Air	AT Prep (KMnO4)	11528
140-8115-53	R-2622 F2 QC M29 KMNO4/H2SO4 IMP RB #2	Total/NA	Air	AT Prep (KMnO4)	11528
MB 140-11528/10-B	Method Blank	Total/NA	Air	AT Prep (KMnO4)	11528
LCS 140-11528/11-B	Lab Control Sample	Total/NA	Air	AT Prep (KMnO4)	11528
140-8115-6 MS	R-2426 F2 R1 M29 KMNO4/H2SO4 IMP	Total/NA	Air	AT Prep (KMnO4)	11528
140-8115-6 MSD	R-2426 F2 R1 M29 KMNO4/H2SO4 IMP	Total/NA	Air	AT Prep (KMnO4)	11528

Pre Prep Batch: 11538

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8115-5	R-2425 F2 R1 M29 EMPTY IMP	Total/NA	Air	Air Train Vol.	
140-8115-12	R-2470 F2 R2 M29 EMPTY IMP	Total/NA	Air	Air Train Vol.	
140-8115-19	R-2515 F2 R3 M29 EMPTY IMP	Total/NA	Air	Air Train Vol.	
140-8115-30	R-2539 F2 R4 M29 EMPTY IMP	Total/NA	Air	Air Train Vol.	
140-8115-37	R-2546 F2 R5 M29 EMPTY IMP	Total/NA	Air	Air Train Vol.	
140-8115-44	R-2553 F2 R6 M29 EMPTY IMP	Total/NA	Air	Air Train Vol.	
MB 140-11538/9-B	Method Blank	Total/NA	Air	Air Train Vol.	
LCS 140-11538/10-B	Lab Control Sample	Total/NA	Air	Air Train Vol.	
140-8115-5 MS	R-2425 F2 R1 M29 EMPTY IMP	Total/NA	Air	Air Train Vol.	
140-8115-5 MSD	R-2425 F2 R1 M29 EMPTY IMP	Total/NA	Air	Air Train Vol.	

Prep Batch: 11539

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8115-5	R-2425 F2 R1 M29 EMPTY IMP	Total/NA	Air	AT Prep (Empty)	11538

Metals (Continued)

Prep Batch: 11539 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8115-12	R-2470 F2 R2 M29 EMPTY IMP	Total/NA	Air	AT Prep (Empty)	11538
140-8115-19	R-2515 F2 R3 M29 EMPTY IMP	Total/NA	Air	AT Prep (Empty)	11538
140-8115-30	R-2539 F2 R4 M29 EMPTY IMP	Total/NA	Air	AT Prep (Empty)	11538
140-8115-37	R-2546 F2 R5 M29 EMPTY IMP	Total/NA	Air	AT Prep (Empty)	11538
140-8115-44	R-2553 F2 R6 M29 EMPTY IMP	Total/NA	Air	AT Prep (Empty)	11538
MB 140-11538/9-B	Method Blank	Total/NA	Air	AT Prep (Empty)	11538
LCS 140-11538/10-B	Lab Control Sample	Total/NA	Air	AT Prep (Empty)	11538
140-8115-5 MS	R-2425 F2 R1 M29 EMPTY IMP	Total/NA	Air	AT Prep (Empty)	11538
140-8115-5 MSD	R-2425 F2 R1 M29 EMPTY IMP	Total/NA	Air	AT Prep (Empty)	11538

Pre Prep Batch: 11540

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8115-7	R-2427 F2 R1 M29 HCL RINSE	Total/NA	Air	Air Train Vol.	
140-8115-14	R-2472 F2 R2 M29 HCL RINSE	Total/NA	Air	Air Train Vol.	
140-8115-21	R-2517 F2 R3 M29 HCL RINSE IMP	Total/NA	Air	Air Train Vol.	
140-8115-32	R-2541 F2 R4 M29 HCL RINSE	Total/NA	Air	Air Train Vol.	
140-8115-39	R-2548 F2 R5 M29 HCL RINSE	Total/NA	Air	Air Train Vol.	
140-8115-46	R-2555 F2 R6 M29 HCL RINSE	Total/NA	Air	Air Train Vol.	
140-8115-54	R-2623 F2 QC M29 HCL RINSE RB #2	Total/NA	Air	Air Train Vol.	
MB 140-11540/10-B	Method Blank	Total/NA	Air	Air Train Vol.	
LCS 140-11540/11-B	Lab Control Sample	Total/NA	Air	Air Train Vol.	
140-8115-7 MS	R-2427 F2 R1 M29 HCL RINSE	Total/NA	Air	Air Train Vol.	
140-8115-7 MSD	R-2427 F2 R1 M29 HCL RINSE	Total/NA	Air	Air Train Vol.	

Prep Batch: 11541

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8115-7	R-2427 F2 R1 M29 HCL RINSE	Total/NA	Air	AT Prep (HCl)	11540
140-8115-14	R-2472 F2 R2 M29 HCL RINSE	Total/NA	Air	AT Prep (HCl)	11540
140-8115-21	R-2517 F2 R3 M29 HCL RINSE IMP	Total/NA	Air	AT Prep (HCl)	11540
140-8115-32	R-2541 F2 R4 M29 HCL RINSE	Total/NA	Air	AT Prep (HCl)	11540
140-8115-39	R-2548 F2 R5 M29 HCL RINSE	Total/NA	Air	AT Prep (HCl)	11540
140-8115-46	R-2555 F2 R6 M29 HCL RINSE	Total/NA	Air	AT Prep (HCl)	11540
140-8115-54	R-2623 F2 QC M29 HCL RINSE RB #2	Total/NA	Air	AT Prep (HCl)	11540
MB 140-11540/10-B	Method Blank	Total/NA	Air	AT Prep (HCl)	11540
LCS 140-11540/11-B	Lab Control Sample	Total/NA	Air	AT Prep (HCl)	11540
140-8115-7 MS	R-2427 F2 R1 M29 HCL RINSE	Total/NA	Air	AT Prep (HCl)	11540
140-8115-7 MSD	R-2427 F2 R1 M29 HCL RINSE	Total/NA	Air	AT Prep (HCl)	11540

Pre Prep Batch: 11542

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8115-4	R-2424 F2 R1 M29 BH IMP	Total/NA	Air	Air Train Vol.	
140-8115-11	R-2469 F2 R2 M29 BH IMP	Total/NA	Air	Air Train Vol.	
140-8115-18	R-2514 F2 R3 M29 BH IMP	Total/NA	Air	Air Train Vol.	
140-8115-29	R-2538 F2 R4 M29 BH IMP	Total/NA	Air	Air Train Vol.	
140-8115-36	R-2545 F2 R5 M29 BH IMP	Total/NA	Air	Air Train Vol.	
140-8115-43	R-2552 F2 R6 M29 BH IMP	Total/NA	Air	Air Train Vol.	
140-8115-52	R-2620 F2 QC M29 BH IMP RB #2	Total/NA	Air	Air Train Vol.	
MB 140-11542/10-B	Method Blank	Total/NA	Air	Air Train Vol.	
LCS 140-11542/11-B	Lab Control Sample	Total/NA	Air	Air Train Vol.	
140-8115-4 MS	R-2424 F2 R1 M29 BH IMP	Total/NA	Air	Air Train Vol.	
140-8115-4 MSD	R-2424 F2 R1 M29 BH IMP	Total/NA	Air	Air Train Vol.	

QC Association Summary

Client: URS Corporation
Project/Site: Suncoke - M5/29

TestAmerica Job ID: 140-8115-1

Prep Batch: 11543

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8115-4	R-2424 F2 R1 M29 BH IMP	Total/NA	Air	AT Prep (BH)	11542
140-8115-11	R-2469 F2 R2 M29 BH IMP	Total/NA	Air	AT Prep (BH)	11542
140-8115-18	R-2514 F2 R3 M29 BH IMP	Total/NA	Air	AT Prep (BH)	11542
140-8115-29	R-2538 F2 R4 M29 BH IMP	Total/NA	Air	AT Prep (BH)	11542
140-8115-36	R-2545 F2 R5 M29 BH IMP	Total/NA	Air	AT Prep (BH)	11542
140-8115-43	R-2552 F2 R6 M29 BH IMP	Total/NA	Air	AT Prep (BH)	11542
140-8115-52	R-2620 F2 QC M29 BH IMP RB #2	Total/NA	Air	AT Prep (BH)	11542
MB 140-11542/10-B	Method Blank	Total/NA	Air	AT Prep (BH)	11542
LCS 140-11542/11-B	Lab Control Sample	Total/NA	Air	AT Prep (BH)	11542
140-8115-4 MS	R-2424 F2 R1 M29 BH IMP	Total/NA	Air	AT Prep (BH)	11542
140-8115-4 MSD	R-2424 F2 R1 M29 BH IMP	Total/NA	Air	AT Prep (BH)	11542

Analysis Batch: 11616

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8115-4	R-2424 F2 R1 M29 BH IMP	Total/NA	Air	29/7470A	11543
140-8115-5	R-2425 F2 R1 M29 EMPTY IMP	Total/NA	Air	29/7470A	11539
140-8115-6	R-2426 F2 R1 M29 KMNO4/H2SO4 IMP	Total/NA	Air	29/7470A	11529
140-8115-7	R-2427 F2 R1 M29 HCL RINSE	Total/NA	Air	29/7470A	11541
140-8115-11	R-2469 F2 R2 M29 BH IMP	Total/NA	Air	29/7470A	11543
140-8115-12	R-2470 F2 R2 M29 EMPTY IMP	Total/NA	Air	29/7470A	11539
140-8115-13	R-2471 F2 R2 M29 KMNO4/H2SO4 IMP	Total/NA	Air	29/7470A	11529
140-8115-14	R-2472 F2 R2 M29 HCL RINSE	Total/NA	Air	29/7470A	11541
140-8115-18	R-2514 F2 R3 M29 BH IMP	Total/NA	Air	29/7470A	11543
140-8115-19	R-2515 F2 R3 M29 EMPTY IMP	Total/NA	Air	29/7470A	11539
140-8115-20	R-2516 F2 R3 M29 KMNO4/H2SO4 IMP	Total/NA	Air	29/7470A	11529
140-8115-21	R-2517 F2 R3 M29 HCL RINSE IMP	Total/NA	Air	29/7470A	11541
140-8115-29	R-2538 F2 R4 M29 BH IMP	Total/NA	Air	29/7470A	11543
140-8115-30	R-2539 F2 R4 M29 EMPTY IMP	Total/NA	Air	29/7470A	11539
140-8115-31	R-2540 F2 R4 M29 KMNO4/H2SO4 IMP	Total/NA	Air	29/7470A	11529
140-8115-32	R-2541 F2 R4 M29 HCL RINSE	Total/NA	Air	29/7470A	11541
140-8115-36	R-2545 F2 R5 M29 BH IMP	Total/NA	Air	29/7470A	11543
140-8115-37	R-2546 F2 R5 M29 EMPTY IMP	Total/NA	Air	29/7470A	11539
140-8115-38	R-2547 F2 R5 M29 KMNO4/H2SO4 IMP	Total/NA	Air	29/7470A	11529
140-8115-39	R-2548 F2 R5 M29 HCL RINSE	Total/NA	Air	29/7470A	11541
140-8115-43	R-2552 F2 R6 M29 BH IMP	Total/NA	Air	29/7470A	11543
140-8115-44	R-2553 F2 R6 M29 EMPTY IMP	Total/NA	Air	29/7470A	11539
140-8115-45	R-2554 F2 R6 M29 KMNO4 IMP	Total/NA	Air	29/7470A	11529
140-8115-46	R-2555 F2 R6 M29 HCL RINSE	Total/NA	Air	29/7470A	11541
140-8115-52	R-2620 F2 QC M29 BH IMP RB #2	Total/NA	Air	29/7470A	11543
140-8115-53	R-2622 F2 QC M29 KMNO4/H2SO4 IMP RB #2	Total/NA	Air	29/7470A	11529
140-8115-54	R-2623 F2 QC M29 HCL RINSE RB #2	Total/NA	Air	29/7470A	11541
MB 140-11528/10-B	Method Blank	Total/NA	Air	29/7470A	11529
MB 140-11538/9-B	Method Blank	Total/NA	Air	29/7470A	11539
MB 140-11540/10-B	Method Blank	Total/NA	Air	29/7470A	11541
MB 140-11542/10-B	Method Blank	Total/NA	Air	29/7470A	11543
LCS 140-11528/11-B	Lab Control Sample	Total/NA	Air	29/7470A	11529
LCS 140-11538/10-B	Lab Control Sample	Total/NA	Air	29/7470A	11539
LCS 140-11540/11-B	Lab Control Sample	Total/NA	Air	29/7470A	11541
LCS 140-11542/11-B	Lab Control Sample	Total/NA	Air	29/7470A	11543
140-8115-4 MS	R-2424 F2 R1 M29 BH IMP	Total/NA	Air	29/7470A	11543
140-8115-4 MSD	R-2424 F2 R1 M29 BH IMP	Total/NA	Air	29/7470A	11543
140-8115-5 MS	R-2425 F2 R1 M29 EMPTY IMP	Total/NA	Air	29/7470A	11539
140-8115-5 MSD	R-2425 F2 R1 M29 EMPTY IMP	Total/NA	Air	29/7470A	11539

Metals (Continued)

Analysis Batch: 11616 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8115-6 MS	R-2426 F2 R1 M29 KMNO4/H2SO4 IMP	Total/NA	Air	29/7470A	11529
140-8115-6 MSD	R-2426 F2 R1 M29 KMNO4/H2SO4 IMP	Total/NA	Air	29/7470A	11529
140-8115-7 MS	R-2427 F2 R1 M29 HCL RINSE	Total/NA	Air	29/7470A	11541
140-8115-7 MSD	R-2427 F2 R1 M29 HCL RINSE	Total/NA	Air	29/7470A	11541

Prep Batch: 11655

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8115-3	R-2421,2422,2423 F2 R1 M29 FH COMP	Total/NA	Air	AT Prep (FH)	
140-8115-10	R-2466,2467,2468 F2 R2 M29 FH COMP	Total/NA	Air	AT Prep (FH)	
140-8115-17	R-2511,2512,2513 F2 R3 M29 FH COMP	Total/NA	Air	AT Prep (FH)	
140-8115-28	R-2535,2536,2537 F2 R4 M29 FH COMP	Total/NA	Air	AT Prep (FH)	
140-8115-35	R-2542,2543,2544 F2 R5 M29 FH COMP	Total/NA	Air	AT Prep (FH)	
140-8115-42	R-2549,2550,2551 F2 R6 M29 FH COMP	Total/NA	Air	AT Prep (FH)	
140-8115-51	R-2617,2618,2619 F2 QC M29 FH COMP RB #2	Total/NA	Air	AT Prep (FH)	
140-8115-55	A-6252 MEDIA CHECK FILTER	Total/NA	Air	AT Prep (FH)	
MB 140-11655/9-B	Method Blank	Total/NA	Air	AT Prep (FH)	
LCS 140-11655/10-B	Lab Control Sample	Total/NA	Air	AT Prep (FH)	
LCSD 140-11655/11-B	Lab Control Sample Dup	Total/NA	Air	AT Prep (FH)	

Cleanup Batch: 11656

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8115-3	R-2421,2422,2423 F2 R1 M29 FH COMP	Total/NA	Air	AT Prep FH	11655
140-8115-10	R-2466,2467,2468 F2 R2 M29 FH COMP	Total/NA	Air	AT Prep FH	11655
140-8115-17	R-2511,2512,2513 F2 R3 M29 FH COMP	Total/NA	Air	AT Prep FH	11655
140-8115-28	R-2535,2536,2537 F2 R4 M29 FH COMP	Total/NA	Air	AT Prep FH	11655
140-8115-35	R-2542,2543,2544 F2 R5 M29 FH COMP	Total/NA	Air	AT Prep FH	11655
140-8115-42	R-2549,2550,2551 F2 R6 M29 FH COMP	Total/NA	Air	AT Prep FH	11655
140-8115-51	R-2617,2618,2619 F2 QC M29 FH COMP RB #2	Total/NA	Air	AT Prep FH	11655
140-8115-55	A-6252 MEDIA CHECK FILTER	Total/NA	Air	AT Prep FH	11655
MB 140-11655/9-B	Method Blank	Total/NA	Air	AT Prep FH	11655
LCS 140-11655/10-B	Lab Control Sample	Total/NA	Air	AT Prep FH	11655
LCSD 140-11655/11-B	Lab Control Sample Dup	Total/NA	Air	AT Prep FH	11655

Analysis Batch: 11672

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8115-3	R-2421,2422,2423 F2 R1 M29 FH COMP	Total/NA	Air	29/7470A	11656
140-8115-10	R-2466,2467,2468 F2 R2 M29 FH COMP	Total/NA	Air	29/7470A	11656
140-8115-17	R-2511,2512,2513 F2 R3 M29 FH COMP	Total/NA	Air	29/7470A	11656
140-8115-28	R-2535,2536,2537 F2 R4 M29 FH COMP	Total/NA	Air	29/7470A	11656
140-8115-35	R-2542,2543,2544 F2 R5 M29 FH COMP	Total/NA	Air	29/7470A	11656
140-8115-42	R-2549,2550,2551 F2 R6 M29 FH COMP	Total/NA	Air	29/7470A	11656
140-8115-51	R-2617,2618,2619 F2 QC M29 FH COMP RB #2	Total/NA	Air	29/7470A	11656
140-8115-55	A-6252 MEDIA CHECK FILTER	Total/NA	Air	29/7470A	11656
MB 140-11655/9-B	Method Blank	Total/NA	Air	29/7470A	11656
LCS 140-11655/10-B	Lab Control Sample	Total/NA	Air	29/7470A	11656
LCSD 140-11655/11-B	Lab Control Sample Dup	Total/NA	Air	29/7470A	11656

Prep Batch: 211848

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8115-4	R-2424 F2 R1 M29 BH IMP	Total/NA	Air	AT Prep (BH)	
140-8115-11	R-2469 F2 R2 M29 BH IMP	Total/NA	Air	AT Prep (BH)	

Metals (Continued)

Prep Batch: 211848 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8115-18	R-2514 F2 R3 M29 BH IMP	Total/NA	Air	AT Prep (BH)	
140-8115-29	R-2538 F2 R4 M29 BH IMP	Total/NA	Air	AT Prep (BH)	
140-8115-36	R-2545 F2 R5 M29 BH IMP	Total/NA	Air	AT Prep (BH)	
140-8115-43	R-2552 F2 R6 M29 BH IMP	Total/NA	Air	AT Prep (BH)	
140-8115-52	R-2620 F2 QC M29 BH IMP RB #2	Total/NA	Air	AT Prep (BH)	
MB 180-211848/8-A	Method Blank	Total/NA	Air	AT Prep (BH)	
LCS 180-211848/9-A	Lab Control Sample	Total/NA	Air	AT Prep (BH)	
LCSD 180-211848/10-A	Lab Control Sample Dup	Total/NA	Air	AT Prep (BH)	

Prep Batch: 212181

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8115-3	R-2421,2422,2423 F2 R1 M29 FH COMP	Total/NA	Air	AT Prep (FH)	
140-8115-10	R-2466,2467,2468 F2 R2 M29 FH COMP	Total/NA	Air	AT Prep (FH)	
140-8115-17	R-2511,2512,2513 F2 R3 M29 FH COMP	Total/NA	Air	AT Prep (FH)	
140-8115-28	R-2535,2536,2537 F2 R4 M29 FH COMP	Total/NA	Air	AT Prep (FH)	
140-8115-35	R-2542,2543,2544 F2 R5 M29 FH COMP	Total/NA	Air	AT Prep (FH)	
140-8115-42	R-2549,2550,2551 F2 R6 M29 FH COMP	Total/NA	Air	AT Prep (FH)	
140-8115-51	R-2617,2618,2619 F2 QC M29 FH COMP RB #2	Total/NA	Air	AT Prep (FH)	
140-8115-55	A-6252 MEDIA CHECK FILTER	Total/NA	Air	AT Prep (FH)	
MB 180-212181/9-A ^5	Method Blank	Total/NA	Air	AT Prep (FH)	
LCS 180-212181/10-A ^5	Lab Control Sample	Total/NA	Air	AT Prep (FH)	
LCSD 180-212181/11-A ^5	Lab Control Sample Dup	Total/NA	Air	AT Prep (FH)	

Analysis Batch: 216315

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8115-3	R-2421,2422,2423 F2 R1 M29 FH COMP	Total/NA	Air	29/6020A	212181
140-8115-4	R-2424 F2 R1 M29 BH IMP	Total/NA	Air	29/6020A	211848
140-8115-10	R-2466,2467,2468 F2 R2 M29 FH COMP	Total/NA	Air	29/6020A	212181
140-8115-11	R-2469 F2 R2 M29 BH IMP	Total/NA	Air	29/6020A	211848
140-8115-17	R-2511,2512,2513 F2 R3 M29 FH COMP	Total/NA	Air	29/6020A	212181
140-8115-18	R-2514 F2 R3 M29 BH IMP	Total/NA	Air	29/6020A	211848
140-8115-28	R-2535,2536,2537 F2 R4 M29 FH COMP	Total/NA	Air	29/6020A	212181
140-8115-29	R-2538 F2 R4 M29 BH IMP	Total/NA	Air	29/6020A	211848
140-8115-35	R-2542,2543,2544 F2 R5 M29 FH COMP	Total/NA	Air	29/6020A	212181
140-8115-36	R-2545 F2 R5 M29 BH IMP	Total/NA	Air	29/6020A	211848
140-8115-42	R-2549,2550,2551 F2 R6 M29 FH COMP	Total/NA	Air	29/6020A	212181
140-8115-43	R-2552 F2 R6 M29 BH IMP	Total/NA	Air	29/6020A	211848
140-8115-51	R-2617,2618,2619 F2 QC M29 FH COMP RB #2	Total/NA	Air	29/6020A	212181
140-8115-52	R-2620 F2 QC M29 BH IMP RB #2	Total/NA	Air	29/6020A	211848
140-8115-55	A-6252 MEDIA CHECK FILTER	Total/NA	Air	29/6020A	212181
MB 180-211848/8-A	Method Blank	Total/NA	Air	29/6020A	211848
MB 180-212181/9-A ^5	Method Blank	Total/NA	Air	29/6020A	212181
LCS 180-211848/9-A	Lab Control Sample	Total/NA	Air	29/6020A	211848
LCS 180-212181/10-A ^5	Lab Control Sample	Total/NA	Air	29/6020A	212181
LCSD 180-211848/10-A	Lab Control Sample Dup	Total/NA	Air	29/6020A	211848
LCSD 180-212181/11-A ^5	Lab Control Sample Dup	Total/NA	Air	29/6020A	212181

General Chemistry

Analysis Batch: 11498

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8115-1	R-2421 F2 R1 M5 FILTER	Total/NA	Air	5	
140-8115-2	R-2422 F2 R1 M5 ACETONE	Total/NA	Air	5	
140-8115-8	R-2466 F2 R2 M5 FILTER	Total/NA	Air	5	
140-8115-9	R-2467 F2 R2 M5 ACETONE	Total/NA	Air	5	
140-8115-15	R-2511 F2 R3 M5 FILTER	Total/NA	Air	5	
140-8115-16	R-2512 F2 R3 M5 ACETONE	Total/NA	Air	5	
140-8115-26	R-2535 F2 R4 M5 FILTER	Total/NA	Air	5	
140-8115-27	R-2536 F2 R4 M5 ACETONE	Total/NA	Air	5	
140-8115-33	R-2542 F2 R5 M5 FILTER	Total/NA	Air	5	
140-8115-34	R-2543 F2 R5 M5 ACETONE	Total/NA	Air	5	
140-8115-40	R-2549 F2 R6 M5 FILTER	Total/NA	Air	5	
140-8115-41	R-2550 F2 R6 M5 ACETONE	Total/NA	Air	5	
140-8115-49	R-2617 F2 QC M5 FILTER RB #2	Total/NA	Air	5	
140-8115-50	R-2618 F2 QC M5 ACETONE RB #2	Total/NA	Air	5	
140-8115-55	A-6252 MEDIA CHECK FILTER	Total/NA	Air	5	

Client Sample ID: R-2421,2422,2423 F2 R1 M29 FH COMP

Lab Sample ID: 140-8115-3

Date Collected: 05/08/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Air Train

Method: 29/6020A - Metals (ICPMS), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	201		0.500	0.445	ug/Sample		05/24/17 12:00	07/05/17 20:14	5
Beryllium	2.47	B	0.500	0.0850	ug/Sample		05/24/17 12:00	07/05/17 20:14	5
Cadmium	13.6		0.500	0.365	ug/Sample		05/24/17 12:00	07/05/17 20:14	5
Cobalt	10.6		0.250	0.0873	ug/Sample		05/24/17 12:00	07/05/17 20:14	5
Chromium	12.9		10.0	8.00	ug/Sample		05/24/17 12:00	07/05/17 20:14	5
Lead	629		0.750	0.600	ug/Sample		05/24/17 12:00	07/05/17 20:14	5
Antimony	36.8		1.00	0.900	ug/Sample		05/24/17 12:00	07/05/17 20:14	5
Nickel	61.4		6.00	5.00	ug/Sample		05/24/17 12:00	07/05/17 20:14	5
Manganese	13.7		2.50	1.70	ug/Sample		05/24/17 12:00	07/05/17 20:14	5
Selenium	66.1		2.50	0.150	ug/Sample		05/24/17 12:00	07/05/17 20:14	5

Method: 29/7470A - Mercury (CVAA), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	0.188	J	0.200	0.0800	ug/Sample		05/24/17 12:00	05/30/17 15:12	1

Client: URS Corporation
Project/Site: Suncoke - M5/29

TestAmerica Job ID: 140-8115-1

Client Sample ID: R-2424 F2 R1 M29 BH IMP
Lab Sample ID: 140-8115-4
Date Collected: 05/08/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Air Train

Method: 29/6020A - Metals (ICPMS), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	45.1	B	0.100	0.0110	ug/Sample		05/22/17 09:22	07/05/17 19:01	1
Beryllium	0.0176	J	0.100	0.00233	ug/Sample		05/22/17 09:22	07/05/17 19:01	1
Cadmium	0.122		0.100	0.0195	ug/Sample		05/22/17 09:22	07/05/17 19:01	1
Cobalt	0.144		0.0700	0.0600	ug/Sample		05/22/17 09:22	07/05/17 19:01	1
Chromium	6.58		0.200	0.0507	ug/Sample		05/22/17 09:22	07/05/17 19:01	1
Lead	6.00		0.100	0.0300	ug/Sample		05/22/17 09:22	07/05/17 19:01	1
Antimony	0.613		0.300	0.240	ug/Sample		05/22/17 09:22	07/05/17 19:01	1
Nickel	1.72	B	0.100	0.0291	ug/Sample		05/22/17 09:22	07/05/17 19:01	1
Manganese	2.23		0.500	0.105	ug/Sample		05/22/17 09:22	07/05/17 19:01	1
Selenium	112		0.500	0.0279	ug/Sample		05/22/17 09:22	07/05/17 19:01	1

Method: 29/7470A - Mercury (CVAA), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	13.7		0.400	0.120	ug/Sample		05/25/17 09:00	05/26/17 11:33	1

Client: URS Corporation
Project/Site: Suncoke - M5/29

TestAmerica Job ID: 140-8115-1

Client Sample ID: R-2425 F2 R1 M29 EMPTY IMP
Lab Sample ID: 140-8115-5
Date Collected: 05/08/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Air Train

Method: 29/7470A - Mercury (CVAA), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	2.40		0.180	0.0540	ug/Sample		05/25/17 09:00	05/26/17 12:05	1

Client: URS Corporation
Project/Site: Suncoke - M5/29

TestAmerica Job ID: 140-8115-1

Client Sample ID: R-2426 F2 R1 M29 KMNO4/H2SO4 IMP
Lab Sample ID: 140-8115-6
Date Collected: 05/08/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Air Train

Method: 29/7470A - Mercury (CVAA), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	0.559		0.160	0.0480	ug/Sample		05/25/17 09:00	05/26/17 12:35	1

Client: URS Corporation
Project/Site: Suncoke - M5/29

TestAmerica Job ID: 140-8115-1

Client Sample ID: R-2427 F2 R1 M29 HCL RINSE — **Lab Sample ID: 140-8115-7**

Date Collected: 05/08/17 00:00 — **Matrix: Air**

Date Received: 05/16/17 13:05

Sample Container: Air Train

Method: 29/7470A - Mercury (CVAA), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	7.89		0.290	0.0870	ug/Sample		05/25/17 09:00	05/26/17 13:08	1

Client Sample ID: R-2466,2467,2468 F2 R2 M29 FH COMP

Lab Sample ID: 140-8115-10

Date Collected: 05/08/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Air Train

Method: 29/6020A - Metals (ICPMS), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	230		0.500	0.445	ug/Sample		05/24/17 12:00	07/05/17 20:47	5
Beryllium	2.41	B	0.500	0.0850	ug/Sample		05/24/17 12:00	07/05/17 20:47	5
Cadmium	14.5		0.500	0.365	ug/Sample		05/24/17 12:00	07/05/17 20:47	5
Cobalt	11.6		0.250	0.0873	ug/Sample		05/24/17 12:00	07/05/17 20:47	5
Chromium	13.7		10.0	8.00	ug/Sample		05/24/17 12:00	07/05/17 20:47	5
Lead	1070		0.750	0.600	ug/Sample		05/24/17 12:00	07/05/17 20:47	5
Antimony	42.3		1.00	0.900	ug/Sample		05/24/17 12:00	07/05/17 20:47	5
Nickel	79.8		6.00	5.00	ug/Sample		05/24/17 12:00	07/05/17 20:47	5
Manganese	11.7		2.50	1.70	ug/Sample		05/24/17 12:00	07/05/17 20:47	5
Selenium	87.1		2.50	0.150	ug/Sample		05/24/17 12:00	07/05/17 20:47	5

Method: 29/7470A - Mercury (CVAA), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	0.321		0.200	0.0800	ug/Sample		05/24/17 12:00	05/30/17 15:19	1

Client Sample ID: R-2469 F2 R2 M29 BH IMP

Lab Sample ID: 140-8115-11

Date Collected: 05/08/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Air Train

Method: 29/6020A - Metals (ICPMS), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	61.1	B	0.100	0.0110	ug/Sample		05/22/17 09:22	07/05/17 19:18	1
Beryllium	0.0325	J	0.100	0.00233	ug/Sample		05/22/17 09:22	07/05/17 19:18	1
Cadmium	0.0286	J	0.100	0.0195	ug/Sample		05/22/17 09:22	07/05/17 19:18	1
Cobalt	0.0785		0.0700	0.0600	ug/Sample		05/22/17 09:22	07/05/17 19:18	1
Chromium	4.71		0.200	0.0507	ug/Sample		05/22/17 09:22	07/05/17 19:18	1
Lead	4.69		0.100	0.0300	ug/Sample		05/22/17 09:22	07/05/17 19:18	1
Antimony	0.576		0.300	0.240	ug/Sample		05/22/17 09:22	07/05/17 19:18	1
Nickel	1.77	B	0.100	0.0291	ug/Sample		05/22/17 09:22	07/05/17 19:18	1
Manganese	2.04		0.500	0.105	ug/Sample		05/22/17 09:22	07/05/17 19:18	1
Selenium	128		0.500	0.0279	ug/Sample		05/22/17 09:22	07/05/17 19:18	1

Method: 29/7470A - Mercury (CVAA), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	18.5		0.400	0.120	ug/Sample		05/25/17 09:00	05/26/17 11:40	1

Client Sample ID: R-2470 F2 R2 M29 EMPTY IMP — **Lab Sample ID: 140-8115-12**

Date Collected: 05/08/17 00:00 — **Matrix: Air**

Date Received: 05/16/17 13:05

Sample Container: Air Train

Method: 29/7470A - Mercury (CVAA), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	1.40		0.100	0.0300	ug/Sample		05/25/17 09:00	05/26/17 12:12	1

Client: URS Corporation
Project/Site: Suncoke - M5/29

TestAmerica Job ID: 140-8115-1

Client Sample ID: R-2471 F2 R2 M29 KMNO4/H2SO4 IMP **Lab Sample ID: 140-8115-13**
Date Collected: 05/08/17 00:00 **Matrix: Air**
Date Received: 05/16/17 13:05
Sample Container: Air Train

Method: 29/7470A - Mercury (CVAA), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	0.240		0.152	0.0456	ug/Sample		05/25/17 09:00	05/26/17 12:43	1

Client: URS Corporation
Project/Site: Suncoke - M5/29

TestAmerica Job ID: 140-8115-1

Client Sample ID: R-2472 F2 R2 M29 HCL RINSE
Lab Sample ID: 140-8115-14
Date Collected: 05/08/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Air Train

Method: 29/7470A - Mercury (CVAA), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	5.95		0.290	0.0870	ug/Sample		05/25/17 09:00	05/26/17 13:15	1

Client Sample ID: R-2511,2512,2513 F2 R3 M29 FH COMP

Lab Sample ID: 140-8115-17

Date Collected: 05/09/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Air Train

Method: 29/6020A - Metals (ICPMS), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**140**		0.500	0.445	ug/Sample		05/24/17 12:00	07/05/17 20:51	5
Beryllium	**2.13**	**B**	0.500	0.0850	ug/Sample		05/24/17 12:00	07/05/17 20:51	5
Cadmium	**16.1**		0.500	0.365	ug/Sample		05/24/17 12:00	07/05/17 20:51	5
Cobalt	**9.67**		0.250	0.0873	ug/Sample		05/24/17 12:00	07/05/17 20:51	5
Chromium	**11.7**		10.0	8.00	ug/Sample		05/24/17 12:00	07/05/17 20:51	5
Lead	**847**		0.750	0.600	ug/Sample		05/24/17 12:00	07/05/17 20:51	5
Antimony	**35.1**		1.00	0.900	ug/Sample		05/24/17 12:00	07/05/17 20:51	5
Nickel	**63.0**		6.00	5.00	ug/Sample		05/24/17 12:00	07/05/17 20:51	5
Manganese	**12.1**		2.50	1.70	ug/Sample		05/24/17 12:00	07/05/17 20:51	5
Selenium	**10.4**		2.50	0.150	ug/Sample		05/24/17 12:00	07/05/17 20:51	5

Method: 29/7470A - Mercury (CVAA), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.200	0.0800	ug/Sample		05/24/17 12:00	05/30/17 15:22	1

Client Sample ID: R-2514 F2 R3 M29 BH IMP

Lab Sample ID: 140-8115-18

Date Collected: 05/09/17 00:00

Matrix: Air

Date Received: 05/16/17 13:05

Sample Container: Air Train

Method: 29/6020A - Metals (ICPMS), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	136	B	0.100	0.0110	ug/Sample		05/22/17 09:22	07/05/17 19:22	1
Beryllium	0.0236	J	0.100	0.00233	ug/Sample		05/22/17 09:22	07/05/17 19:22	1
Cadmium	0.0575	J	0.100	0.0195	ug/Sample		05/22/17 09:22	07/05/17 19:22	1
Cobalt	0.0604	J	0.0700	0.0600	ug/Sample		05/22/17 09:22	07/05/17 19:22	1
Chromium	4.51		0.200	0.0507	ug/Sample		05/22/17 09:22	07/05/17 19:22	1
Lead	2.64		0.100	0.0300	ug/Sample		05/22/17 09:22	07/05/17 19:22	1
Antimony	1.05		0.300	0.240	ug/Sample		05/22/17 09:22	07/05/17 19:22	1
Nickel	2.58	B	0.100	0.0291	ug/Sample		05/22/17 09:22	07/05/17 19:22	1
Manganese	2.72		0.500	0.105	ug/Sample		05/22/17 09:22	07/05/17 19:22	1
Selenium	159		0.500	0.0279	ug/Sample		05/22/17 09:22	07/05/17 19:22	1

Method: 29/7470A - Mercury (CVAA), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	19.0		0.800	0.240	ug/Sample		05/25/17 09:00	05/26/17 13:45	2

Client: URS Corporation
Project/Site: Suncoke - M5/29

TestAmerica Job ID: 140-8115-1

Client Sample ID: R-2515 F2 R3 M29 EMPTY IMP — **Lab Sample ID: 140-8115-19**

Date Collected: 05/09/17 00:00 — **Matrix: Air**

Date Received: 05/16/17 13:05

Sample Container: Air Train

Method: 29/7470A - Mercury (CVAA), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	2.34		0.100	0.0300	ug/Sample		05/25/17 09:00	05/26/17 12:15	1

Client: URS Corporation
Project/Site: Suncoke - M5/29

TestAmerica Job ID: 140-8115-1

Client Sample ID: R-2516 F2 R3 M29 KMNO4/H2SO4 IMP — **Lab Sample ID: 140-8115-20**
Date Collected: 05/09/17 00:00 — **Matrix: Air**
Date Received: 05/16/17 13:05
Sample Container: Air Train

Method: 29/7470A - Mercury (CVAA), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	0.546		0.152	0.0456	ug/Sample		05/25/17 09:00	05/26/17 12:45	1

Client Sample ID: R-2517 F2 R3 M29 HCL RINSE IMP **Lab Sample ID: 140-8115-21**

Date Collected: 05/09/17 00:00 **Matrix: Air**

Date Received: 05/16/17 13:05

Sample Container: Air Train

Method: 29/7470A - Mercury (CVAA), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	6.36		0.280	0.0840	ug/Sample		05/25/17 09:00	05/26/17 13:17	1

Client Sample ID: R-2617,2618,2619 F2 QC M29 FH COMP RB #2

Lab Sample ID: 140-8115-51

Date Collected: 05/11/17 00:00
Date Received: 05/16/17 13:05
Sample Container: Air Train

Matrix: Air

Method: 29/6020A - Metals (ICPMS), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.500	0.445	ug/Sample		05/24/17 12:00	07/05/17 21:07	5
Beryllium	ND		0.500	0.0850	ug/Sample		05/24/17 12:00	07/05/17 21:07	5
Cadmium	ND		0.500	0.365	ug/Sample		05/24/17 12:00	07/05/17 21:07	5
Cobalt	ND		0.250	0.0873	ug/Sample		05/24/17 12:00	07/05/17 21:07	5
Chromium	ND		10.0	8.00	ug/Sample		05/24/17 12:00	07/05/17 21:07	5
Lead	ND		0.750	0.600	ug/Sample		05/24/17 12:00	07/05/17 21:07	5
Antimony	ND		1.00	0.900	ug/Sample		05/24/17 12:00	07/05/17 21:07	5
Nickel	ND		6.00	5.00	ug/Sample		05/24/17 12:00	07/05/17 21:07	5
Manganese	ND		2.50	1.70	ug/Sample		05/24/17 12:00	07/05/17 21:07	5
Selenium	**0.333**	**J**	2.50	0.150	ug/Sample		05/24/17 12:00	07/05/17 21:07	5

Method: 29/7470A - Mercury (CVAA), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.200	0.0800	ug/Sample		05/24/17 12:00	05/30/17 15:37	1

Client Sample ID: R-2620 F2 QC M29 BH IMP RB #2

Lab Sample ID: 140-8115-52

Date Collected: 05/11/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Air Train

Method: 29/6020A - Metals (ICPMS), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.455**	**B**	0.100	0.0110	ug/Sample		05/22/17 09:22	07/05/17 19:54	1
Beryllium	**0.0238**	**J**	0.100	0.00233	ug/Sample		05/22/17 09:22	07/05/17 19:54	1
Cadmium	ND		0.100	0.0195	ug/Sample		05/22/17 09:22	07/05/17 19:54	1
Cobalt	ND		0.0700	0.0600	ug/Sample		05/22/17 09:22	07/05/17 19:54	1
Chromium	**10.6**		0.200	0.0507	ug/Sample		05/22/17 09:22	07/05/17 19:54	1
Lead	**0.0791**	**J**	0.100	0.0300	ug/Sample		05/22/17 09:22	07/05/17 19:54	1
Antimony	**0.294**	**J**	0.300	0.240	ug/Sample		05/22/17 09:22	07/05/17 19:54	1
Nickel	**0.791**	**B**	0.100	0.0291	ug/Sample		05/22/17 09:22	07/05/17 19:54	1
Manganese	**0.757**		0.500	0.105	ug/Sample		05/22/17 09:22	07/05/17 19:54	1
Selenium	**0.197**	**J**	0.500	0.0279	ug/Sample		05/22/17 09:22	07/05/17 19:54	1

Method: 29/7470A - Mercury (CVAA), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	**0.148**	**J**	0.400	0.120	ug/Sample		05/25/17 09:00	05/26/17 11:57	1

Client: URS Corporation
Project/Site: Suncoke - M5/29

TestAmerica Job ID: 140-8115-1

Client Sample ID: R-2622 F2 QC M29 KMNO4/H2SO4 IMP RB #2

Lab Sample ID: 140-8115-53

Date Collected: 05/11/17 00:00
Date Received: 05/16/17 13:05
Sample Container: Air Train

Matrix: Air

Method: 29/7470A - Mercury (CVAA), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.0400	0.0120	ug/Sample		05/25/17 09:00	05/26/17 13:00	1

Client: URS Corporation
Project/Site: Suncoke - M5/29

TestAmerica Job ID: 140-8115-1

Client Sample ID: R-2623 F2 QC M29 HCL RINSE RB #2
Lab Sample ID: 140-8115-54
Date Collected: 05/11/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Air Train

Method: 29/7470A - Mercury (CVAA), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.150	0.0450	ug/Sample		05/25/17 09:00	05/26/17 13:42	1

Client: URS Corporation
Project/Site: Suncoke - M5/29

TestAmerica Job ID: 140-8115-1

Client Sample ID: A-6252 MEDIA CHECK FILTER **Lab Sample ID: 140-8115-55**
Date Collected: 05/08/17 00:00 **Matrix: Air**
Date Received: 05/16/17 13:05
Sample Container: Petri/Filter

Method: 29/6020A - Metals (ICPMS), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.500	0.445	ug/Sample		05/24/17 12:00	07/05/17 21:12	5
Beryllium	ND		0.500	0.0850	ug/Sample		05/24/17 12:00	07/05/17 21:12	5
Cadmium	ND		0.500	0.365	ug/Sample		05/24/17 12:00	07/05/17 21:12	5
Cobalt	ND		0.250	0.0873	ug/Sample		05/24/17 12:00	07/05/17 21:12	5
Chromium	ND		10.0	8.00	ug/Sample		05/24/17 12:00	07/05/17 21:12	5
Lead	ND		0.750	0.600	ug/Sample		05/24/17 12:00	07/05/17 21:12	5
Antimony	ND		1.00	0.900	ug/Sample		05/24/17 12:00	07/05/17 21:12	5
Nickel	ND		6.00	5.00	ug/Sample		05/24/17 12:00	07/05/17 21:12	5
Manganese	ND		2.50	1.70	ug/Sample		05/24/17 12:00	07/05/17 21:12	5
Selenium	ND		2.50	0.150	ug/Sample		05/24/17 12:00	07/05/17 21:12	5

Method: 29/7470A - Mercury (CVAA), Stationary Source

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.200	0.0800	ug/Sample		05/24/17 12:00	05/30/17 15:39	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Particulates, Total	**0.955**		0.500	0.500	mg/sample			05/23/17 09:42	1

Method: 29/6020A - Metals (ICPMS), Stationary Source
Prep: AT Prep (BH)

Analyte	RL	MDL	Units	Method
Antimony	0.300	0.240	ug/Sample	29/6020A
Arsenic	0.100	0.0110	ug/Sample	29/6020A
Beryllium	0.100	0.00233	ug/Sample	29/6020A
Cadmium	0.100	0.0195	ug/Sample	29/6020A
Chromium	0.200	0.0507	ug/Sample	29/6020A
Cobalt	0.0700	0.0600	ug/Sample	29/6020A
Lead	0.100	0.0300	ug/Sample	29/6020A
Manganese	0.500	0.105	ug/Sample	29/6020A
Nickel	0.100	0.0291	ug/Sample	29/6020A
Selenium	0.500	0.0279	ug/Sample	29/6020A

Method: 29/6020A - Metals (ICPMS), Stationary Source
Prep: AT Prep (FH)

Analyte	RL	MDL	Units	Method
Antimony	0.200	0.180	ug/Sample	29/6020A
Arsenic	0.100	0.0890	ug/Sample	29/6020A
Beryllium	0.100	0.0170	ug/Sample	29/6020A
Cadmium	0.100	0.0730	ug/Sample	29/6020A
Chromium	2.00	1.60	ug/Sample	29/6020A
Cobalt	0.0500	0.0175	ug/Sample	29/6020A
Lead	0.150	0.120	ug/Sample	29/6020A
Manganese	0.500	0.340	ug/Sample	29/6020A
Nickel	1.20	1.00	ug/Sample	29/6020A
Selenium	0.500	0.0300	ug/Sample	29/6020A

Method: 29/7470A - Mercury (CVAA), Stationary Source
Prep: AT Prep (BH)

Analyte	RL	MDL	Units	Method
Hg	0.400	0.120	ug/Sample	29/7470A

Method: 29/7470A - Mercury (CVAA), Stationary Source
Prep: AT Prep (Empty)

Analyte	RL	MDL	Units	Method
Hg	0.200	0.0600	ug/Sample	29/7470A

Method: 29/7470A - Mercury (CVAA), Stationary Source
Prep: AT Prep (FH)

Analyte	RL	MDL	Units	Method
Hg	0.200	0.0800	ug/Sample	29/7470A

Method: 29/7470A - Mercury (CVAA), Stationary Source
Prep: AT Prep (HCl)

Analyte	RL	MDL	Units	Method
Hg	0.0500	0.0150	ug/Sample	29/7470A

Method: 29/7470A - Mercury (CVAA), Stationary Source
Prep: AT Prep (KMnO4)

Default Detection Limits

Client: URS Corporation
Project/Site: Suncoke - M5/29

TestAmerica Job ID: 140-8115-1

Method: 29/7470A - Mercury (CVAA), Stationary Source

Prep: AT Prep (KMnO4)

Analyte	RL	MDL	Units	Method
Hg	0.0200	0.00600	ug/Sample	29/7470A

General Chemistry

Analyte	RL	MDL	Units	Method
Particulates, Total	0.500	0.500	mg/sample	5

Method: 29/6020A - Metals (ICPMS), Stationary Source

Lab Sample ID: MB 180-211848/8-A
Matrix: Air
Analysis Batch: 216315

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 211848

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.03440	J	0.100	0.0110	ug/Sample		05/22/17 09:22	07/05/17 18:41	1
Beryllium	ND		0.100	0.00233	ug/Sample		05/22/17 09:22	07/05/17 18:41	1
Cadmium	ND		0.100	0.0195	ug/Sample		05/22/17 09:22	07/05/17 18:41	1
Cobalt	ND		0.0700	0.0600	ug/Sample		05/22/17 09:22	07/05/17 18:41	1
Chromium	ND		0.200	0.0507	ug/Sample		05/22/17 09:22	07/05/17 18:41	1
Lead	ND		0.100	0.0300	ug/Sample		05/22/17 09:22	07/05/17 18:41	1
Antimony	ND		0.300	0.240	ug/Sample		05/22/17 09:22	07/05/17 18:41	1
Nickel	0.05730	J	0.100	0.0291	ug/Sample		05/22/17 09:22	07/05/17 18:41	1
Manganese	ND		0.500	0.105	ug/Sample		05/22/17 09:22	07/05/17 18:41	1
Selenium	ND		0.500	0.0279	ug/Sample		05/22/17 09:22	07/05/17 18:41	1

Lab Sample ID: LCS 180-211848/9-A
Matrix: Air
Analysis Batch: 216315

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 211848

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	4.00	3.967		ug/Sample		99	80 - 120
Beryllium	5.00	4.287		ug/Sample		86	80 - 120
Cadmium	5.00	5.230		ug/Sample		105	80 - 120
Cobalt	50.0	46.84		ug/Sample		94	80 - 120
Chromium	20.0	23.38		ug/Sample		117	80 - 120
Lead	2.00	1.999		ug/Sample		100	80 - 120
Antimony	50.0	48.94		ug/Sample		98	80 - 120
Nickel	50.0	45.75		ug/Sample		92	80 - 120
Manganese	50.0	45.19		ug/Sample		90	80 - 120
Selenium	1.00	0.8947		ug/Sample		89	80 - 120

Lab Sample ID: LCSD 180-211848/10-A
Matrix: Air
Analysis Batch: 216315

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 211848

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	4.00	3.643		ug/Sample		91	80 - 120	9	20
Beryllium	5.00	4.503		ug/Sample		90	80 - 120	5	20
Cadmium	5.00	5.389		ug/Sample		108	80 - 120	3	20
Cobalt	50.0	47.28		ug/Sample		95	80 - 120	1	20
Chromium	20.0	22.60		ug/Sample		113	80 - 120	3	20
Lead	2.00	2.079		ug/Sample		104	80 - 120	4	20
Antimony	50.0	50.46		ug/Sample		101	80 - 120	3	20
Nickel	50.0	45.62		ug/Sample		91	80 - 120	0	20
Manganese	50.0	47.33		ug/Sample		95	80 - 120	5	20
Selenium	1.00	1.004		ug/Sample		100	80 - 120	12	20

Lab Sample ID: MB 180-212181/9-A ^5
Matrix: Air
Analysis Batch: 216315

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 212181

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.500	0.445	ug/Sample		05/24/17 12:00	07/05/17 20:02	5

Method: 29/6020A - Metals (ICPMS), Stationary Source (Continued)

Lab Sample ID: MB 180-212181/9-A ^5
Matrix: Air
Analysis Batch: 216315

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 212181

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Beryllium	0.1330	J	0.500	0.0850	ug/Sample		05/24/17 12:00	07/05/17 20:02	5
Cadmium	ND		0.500	0.365	ug/Sample		05/24/17 12:00	07/05/17 20:02	5
Cobalt	ND		0.250	0.0873	ug/Sample		05/24/17 12:00	07/05/17 20:02	5
Chromium	ND		10.0	8.00	ug/Sample		05/24/17 12:00	07/05/17 20:02	5
Lead	ND		0.750	0.600	ug/Sample		05/24/17 12:00	07/05/17 20:02	5
Antimony	ND		1.00	0.900	ug/Sample		05/24/17 12:00	07/05/17 20:02	5
Nickel	ND		6.00	5.00	ug/Sample		05/24/17 12:00	07/05/17 20:02	5
Manganese	ND		2.50	1.70	ug/Sample		05/24/17 12:00	07/05/17 20:02	5
Selenium	ND		2.50	0.150	ug/Sample		05/24/17 12:00	07/05/17 20:02	5

Lab Sample ID: LCS 180-212181/10-A ^5
Matrix: Air
Analysis Batch: 216315

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 212181

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	4.00	3.628		ug/Sample		91	80 - 120
Beryllium	5.00	4.363		ug/Sample		87	80 - 120
Cadmium	5.00	5.045		ug/Sample		101	80 - 120
Cobalt	50.0	48.07		ug/Sample		96	80 - 120
Chromium	20.0	20.74		ug/Sample		104	80 - 120
Lead	2.00	2.039		ug/Sample		102	80 - 120
Antimony	50.0	50.20		ug/Sample		100	80 - 120
Nickel	50.0	48.13		ug/Sample		96	80 - 120
Manganese	50.0	51.80		ug/Sample		104	80 - 120
Selenium	1.00	1.185	J	ug/Sample		119	80 - 120

Lab Sample ID: LCSD 180-212181/11-A ^5
Matrix: Air
Analysis Batch: 216315

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 212181

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	4.00	3.526		ug/Sample		88	80 - 120	3	20
Beryllium	5.00	4.200		ug/Sample		84	80 - 120	4	20
Cadmium	5.00	5.430		ug/Sample		109	80 - 120	7	20
Cobalt	50.0	49.97		ug/Sample		100	80 - 120	4	20
Chromium	20.0	21.10		ug/Sample		106	80 - 120	2	20
Lead	2.00	1.998		ug/Sample		100	80 - 120	2	20
Antimony	50.0	49.60		ug/Sample		99	80 - 120	1	20
Nickel	50.0	50.85		ug/Sample		102	80 - 120	5	20
Manganese	50.0	52.40		ug/Sample		105	80 - 120	1	20
Selenium	1.00	1.047	J	ug/Sample		105	80 - 120	12	20

Method: 29/7470A - Mercury (CVAA), Stationary Source

Lab Sample ID: MB 140-11528/10-B
Matrix: Air
Analysis Batch: 11616

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 11529

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.0200	0.00600	ug/Sample		05/25/17 09:00	05/26/17 12:31	1

Lab Sample ID: LCS 140-11528/11-B
Matrix: Air
Analysis Batch: 11616

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 11529

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hg	0.500	0.4970		ug/Sample		99	80 - 120

Lab Sample ID: 140-8115-6 MS
Matrix: Air
Analysis Batch: 11616

Client Sample ID: R-2426 F2 R1 M29 KMNO4/H2SO4 IMP
Prep Type: Total/NA
Prep Batch: 11529

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Hg	0.559		0.800	1.272		ug/Sample		89	80 - 120

Lab Sample ID: 140-8115-6 MSD
Matrix: Air
Analysis Batch: 11616

Client Sample ID: R-2426 F2 R1 M29 KMNO4/H2SO4 IMP
Prep Type: Total/NA
Prep Batch: 11529

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hg	0.559		0.800	1.336		ug/Sample		97	80 - 120	5	20

Lab Sample ID: MB 140-11538/9-B
Matrix: Air
Analysis Batch: 11616

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 11539

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.200	0.0600	ug/Sample		05/25/17 09:00	05/26/17 11:59	1

Lab Sample ID: LCS 140-11538/10-B
Matrix: Air
Analysis Batch: 11616

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 11539

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hg	5.00	5.070		ug/Sample		101	80 - 120

Lab Sample ID: 140-8115-5 MS
Matrix: Air
Analysis Batch: 11616

Client Sample ID: R-2425 F2 R1 M29 EMPTY IMP
Prep Type: Total/NA
Prep Batch: 11539

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Hg	2.40		0.900	3.321		ug/Sample		102	80 - 120

Lab Sample ID: 140-8115-5 MSD
Matrix: Air
Analysis Batch: 11616

Client Sample ID: R-2425 F2 R1 M29 EMPTY IMP
Prep Type: Total/NA
Prep Batch: 11539

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hg	2.40		0.900	3.312		ug/Sample		101	80 - 120	0	20

Lab Sample ID: MB 140-11540/10-B
Matrix: Air
Analysis Batch: 11616

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 11541

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.0500	0.0150	ug/Sample		05/25/17 09:00	05/26/17 13:03	1

Lab Sample ID: LCS 140-11540/11-B
Matrix: Air
Analysis Batch: 11616

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 11541

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hg	1.25	1.220		ug/Sample		98	80 - 120

Lab Sample ID: 140-8115-7 MS
Matrix: Air
Analysis Batch: 11616

Client Sample ID: R-2427 F2 R1 M29 HCL RINSE
Prep Type: Total/NA
Prep Batch: 11541

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Hg	7.89		1.45	9.280	4	ug/Sample		96	80 - 120

Lab Sample ID: 140-8115-7 MSD
Matrix: Air
Analysis Batch: 11616

Client Sample ID: R-2427 F2 R1 M29 HCL RINSE
Prep Type: Total/NA
Prep Batch: 11541

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hg	7.89		1.45	9.280	4	ug/Sample		96	80 - 120	0	20

Lab Sample ID: MB 140-11542/10-B
Matrix: Air
Analysis Batch: 11616

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 11543

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.400	0.120	ug/Sample		05/25/17 09:00	05/26/17 11:28	1

Lab Sample ID: LCS 140-11542/11-B
Matrix: Air
Analysis Batch: 11616

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 11543

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hg	10.0	9.900		ug/Sample		99	80 - 120

Lab Sample ID: 140-8115-4 MS
Matrix: Air
Analysis Batch: 11616

Client Sample ID: R-2424 F2 R1 M29 BH IMP
Prep Type: Total/NA
Prep Batch: 11543

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Hg	13.7		2.00	15.36	4	ug/Sample		84	80 - 120

Lab Sample ID: 140-8115-4 MSD
Matrix: Air
Analysis Batch: 11616

Client Sample ID: R-2424 F2 R1 M29 BH IMP
Prep Type: Total/NA
Prep Batch: 11543

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hg	13.7		2.00	15.52	4	ug/Sample		92	80 - 120	1	20

Method: 29/7470A - Mercury (CVAA), Stationary Source (Continued)

Lab Sample ID: MB 140-11655/9-B
Matrix: Air
Analysis Batch: 11672

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 11655

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.200	0.0800	ug/Sample		05/24/17 12:00	05/30/17 15:04	1

Lab Sample ID: LCS 140-11655/10-B
Matrix: Air
Analysis Batch: 11672

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 11655

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hg	5.00	4.810		ug/Sample		96	80 - 120

Lab Sample ID: LCSD 140-11655/11-B
Matrix: Air
Analysis Batch: 11672

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 11655

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hg	5.00	4.620		ug/Sample		92	80 - 120	4	20

Client Sample ID: R-2421 F2 R1 M5 FILTER

Lab Sample ID: 140-8115-1
Matrix: Air
Date Collected: 05/08/17 00:00
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	5		1			11498	05/23/17 09:42	TSN	TAL KNX
	Instrument ID: FT_Gross									

Client Sample ID: R-2422 F2 R1 M5 ACETONE

Lab Sample ID: 140-8115-2
Matrix: Air
Date Collected: 05/08/17 00:00
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	5		1			11498	05/23/17 09:42	TSN	TAL KNX
	Instrument ID: FT_Gross									

Client Sample ID: R-2421,2422,2423 F2 R1 M29 FH COMP

Lab Sample ID: 140-8115-3
Matrix: Air
Date Collected: 05/08/17 00:00
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	AT Prep (FH)			1 Sample	100 mL	212181	05/24/17 12:00		TAL PIT
Total/NA	Analysis	29/6020A		5	1.0 mL	1.0 mL	216315	07/05/17 20:14	WTR	TAL PIT
	Instrument ID: M									
Total/NA	Prep	AT Prep (FH)			1 Sample	100 mL	11655	05/24/17 12:00	PJB	TAL KNX
Total/NA	Cleanup	AT Prep FH			5 mL	50 mL	11656	05/30/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11672	05/30/17 15:12	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: R-2424 F2 R1 M29 BH IMP

Lab Sample ID: 140-8115-4
Matrix: Air
Date Collected: 05/08/17 00:00
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	AT Prep (BH)			1 Sample	100 mL	211848	05/22/17 09:22		TAL PIT
Total/NA	Analysis	29/6020A		1	1.0 mL	1.0 mL	216315	07/05/17 19:01	WTR	TAL PIT
	Instrument ID: M									
Total/NA	Pre Prep	Air Train Vol.			1 Sample	100 mL	11542	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (BH)			2.5 mL	50 mL	11543	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 11:33	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: R-2425 F2 R1 M29 EMPTY IMP

Lab Sample ID: 140-8115-5
Matrix: Air
Date Collected: 05/08/17 00:00
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Air Train Vol.			1 Sample	45 mL	11538	05/25/17 08:00	PJB	TAL KNX

Client Sample ID: R-2425 F2 R1 M29 EMPTY IMP

Lab Sample ID: 140-8115-5
Matrix: Air
Date Collected: 05/08/17 00:00
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	AT Prep (Empty)			2.5 mL	50 mL	11539	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 12:05	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: R-2426 F2 R1 M29 KMNO4/H2SO4 IMP

Lab Sample ID: 140-8115-6
Matrix: Air
Date Collected: 05/08/17 00:00
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Air Train Vol.			1 Sample	400 mL	11528	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (KMnO4)			25 mL	50 mL	11529	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 12:35	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: R-2427 F2 R1 M29 HCL RINSE

Lab Sample ID: 140-8115-7
Matrix: Air
Date Collected: 05/08/17 00:00
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Air Train Vol.			1 Sample	290 mL	11540	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (HCl)			10 mL	50 mL	11541	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 13:08	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: R-2466 F2 R2 M5 FILTER

Lab Sample ID: 140-8115-8
Matrix: Air
Date Collected: 05/08/17 00:00
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	5		1			11498	05/23/17 09:42	TSN	TAL KNX
	Instrument ID: FT_Gross									

Client Sample ID: R-2467 F2 R2 M5 ACETONE

Lab Sample ID: 140-8115-9
Matrix: Air
Date Collected: 05/08/17 00:00
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	5		1			11498	05/23/17 09:42	TSN	TAL KNX
	Instrument ID: FT_Gross									

Client Sample ID: R-2466,2467,2468 F2 R2 M29 FH COMP

Lab Sample ID: 140-8115-10

Date Collected: 05/08/17 00:00

Matrix: Air

Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	AT Prep (FH)			1 Sample	100 mL	212181	05/24/17 12:00		TAL PIT
Total/NA	Analysis	29/6020A		5	1.0 mL	1.0 mL	216315	07/05/17 20:47	WTR	TAL PIT
	Instrument ID: M									
Total/NA	Prep	AT Prep (FH)			1 Sample	100 mL	11655	05/24/17 12:00	PJB	TAL KNX
Total/NA	Cleanup	AT Prep FH			5 mL	50 mL	11656	05/30/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11672	05/30/17 15:19	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: R-2469 F2 R2 M29 BH IMP

Lab Sample ID: 140-8115-11

Date Collected: 05/08/17 00:00

Matrix: Air

Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	AT Prep (BH)			1 Sample	100 mL	211848	05/22/17 09:22		TAL PIT
Total/NA	Analysis	29/6020A		1	1.0 mL	1.0 mL	216315	07/05/17 19:18	WTR	TAL PIT
	Instrument ID: M									
Total/NA	Pre Prep	Air Train Vol.			1 Sample	100 mL	11542	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (BH)			2.5 mL	50 mL	11543	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 11:40	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: R-2470 F2 R2 M29 EMPTY IMP

Lab Sample ID: 140-8115-12

Date Collected: 05/08/17 00:00

Matrix: Air

Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Air Train Vol.			1 Sample	25 mL	11538	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (Empty)			2.5 mL	50 mL	11539	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 12:12	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: R-2471 F2 R2 M29 KMNO4/H2SO4 IMP

Lab Sample ID: 140-8115-13

Date Collected: 05/08/17 00:00

Matrix: Air

Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Air Train Vol.			1 Sample	380 mL	11528	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (KMnO4)			25 mL	50 mL	11529	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 12:43	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: R-2472 F2 R2 M29 HCL RINSE — Lab Sample ID: 140-8115-14

Date Collected: 05/08/17 00:00 — **Matrix: Air**
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Air Train Vol.			1 Sample	290 mL	11540	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (HCl)			10 mL	50 mL	11541	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 13:15	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: R-2511 F2 R3 M5 FILTER — Lab Sample ID: 140-8115-15

Date Collected: 05/09/17 00:00 — **Matrix: Air**
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	5		1			11498	05/23/17 09:42	TSN	TAL KNX
	Instrument ID: FT_Gross									

Client Sample ID: R-2512 F2 R3 M5 ACETONE — Lab Sample ID: 140-8115-16

Date Collected: 05/09/17 00:00 — **Matrix: Air**
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	5		1			11498	05/23/17 09:42	TSN	TAL KNX
	Instrument ID: FT_Gross									

Client Sample ID: R-2511,2512,2513 F2 R3 M29 FH COMP — Lab Sample ID: 140-8115-17

Date Collected: 05/09/17 00:00 — **Matrix: Air**
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	AT Prep (FH)			1 Sample	100 mL	212181	05/24/17 12:00		TAL PIT
Total/NA	Analysis	29/6020A		5	1.0 mL	1.0 mL	216315	07/05/17 20:51	WTR	TAL PIT
	Instrument ID: M									
Total/NA	Prep	AT Prep (FH)			1 Sample	100 mL	11655	05/24/17 12:00	PJB	TAL KNX
Total/NA	Cleanup	AT Prep FH			5 mL	50 mL	11656	05/30/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11672	05/30/17 15:22	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: R-2514 F2 R3 M29 BH IMP — Lab Sample ID: 140-8115-18

Date Collected: 05/09/17 00:00 — **Matrix: Air**
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	AT Prep (BH)			1 Sample	100 mL	211848	05/22/17 09:22		TAL PIT
Total/NA	Analysis	29/6020A		1	1.0 mL	1.0 mL	216315	07/05/17 19:22	WTR	TAL PIT
	Instrument ID: M									
Total/NA	Pre Prep	Air Train Vol.			1 Sample	100 mL	11542	05/25/17 08:00	PJB	TAL KNX

Client Sample ID: R-2514 F2 R3 M29 BH IMP

Lab Sample ID: 140-8115-18

Date Collected: 05/09/17 00:00

Matrix: Air

Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	AT Prep (BH)			2.5 mL	50 mL	11543	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		2			11616	05/26/17 13:45	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: R-2515 F2 R3 M29 EMPTY IMP

Lab Sample ID: 140-8115-19

Date Collected: 05/09/17 00:00

Matrix: Air

Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Air Train Vol.			1 Sample	25 mL	11538	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (Empty)			2.5 mL	50 mL	11539	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 12:15	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: R-2516 F2 R3 M29 KMNO4/H2SO4 IMP

Lab Sample ID: 140-8115-20

Date Collected: 05/09/17 00:00

Matrix: Air

Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Air Train Vol.			1 Sample	380 mL	11528	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (KMnO4)			25 mL	50 mL	11529	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 12:45	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: R-2517 F2 R3 M29 HCL RINSE IMP

Lab Sample ID: 140-8115-21

Date Collected: 05/09/17 00:00

Matrix: Air

Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Air Train Vol.			1 Sample	280 mL	11540	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (HCl)			10 mL	50 mL	11541	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 13:17	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: R-2535 F2 R4 M5 FILTER

Lab Sample ID: 140-8115-26

Date Collected: 05/09/17 00:00

Matrix: Air

Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	5		1			11498	05/23/17 09:42	TSN	TAL KNX
	Instrument ID: FT_Gross									

Client Sample ID: R-2617,2618,2619 F2 QC M29 FH COMP RB #2

Lab Sample ID: 140-8115-51

Date Collected: 05/11/17 00:00
Date Received: 05/16/17 13:05

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	AT Prep (FH)			1 Sample	100 mL	212181	05/24/17 12:00		TAL PIT
Total/NA	Analysis	29/6020A		5	1.0 mL	1.0 mL	216315	07/05/17 21:07	WTR	TAL PIT
	Instrument ID: M									
Total/NA	Prep	AT Prep (FH)			1 Sample	100 mL	11655	05/24/17 12:00	PJB	TAL KNX
Total/NA	Cleanup	AT Prep FH			5 mL	50 mL	11656	05/30/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11672	05/30/17 15:37	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: R-2620 F2 QC M29 BH IMP RB #2

Lab Sample ID: 140-8115-52

Date Collected: 05/11/17 00:00
Date Received: 05/16/17 13:05

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	AT Prep (BH)			1 Sample	100 mL	211848	05/22/17 09:22		TAL PIT
Total/NA	Analysis	29/6020A		1	1.0 mL	1.0 mL	216315	07/05/17 19:54	WTR	TAL PIT
	Instrument ID: M									
Total/NA	Pre Prep	Air Train Vol.			1 Sample	100 mL	11542	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (BH)			2.5 mL	50 mL	11543	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 11:57	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: R-2622 F2 QC M29 KMNO4/H2SO4 IMP RB #2

Lab Sample ID: 140-8115-53

Date Collected: 05/11/17 00:00
Date Received: 05/16/17 13:05

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Air Train Vol.			1 Sample	100 mL	11528	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (KMnO4)			25 mL	50 mL	11529	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 13:00	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: R-2623 F2 QC M29 HCL RINSE RB #2

Lab Sample ID: 140-8115-54

Date Collected: 05/11/17 00:00
Date Received: 05/16/17 13:05

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Air Train Vol.			1 Sample	150 mL	11540	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (HCl)			10 mL	50 mL	11541	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 13:42	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: A-6252 MEDIA CHECK FILTER

Lab Sample ID: 140-8115-55

Date Collected: 05/08/17 00:00

Matrix: Air

Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	AT Prep (FH)			1 Sample	100 mL	212181	05/24/17 12:00		TAL PIT
Total/NA	Analysis	29/6020A		5	1.0 mL	1.0 mL	216315	07/05/17 21:12	WTR	TAL PIT
	Instrument ID: M									
Total/NA	Prep	AT Prep (FH)			1 Sample	100 mL	11655	05/24/17 12:00	PJB	TAL KNX
Total/NA	Cleanup	AT Prep FH			5 mL	50 mL	11656	05/30/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11672	05/30/17 15:39	PJB	TAL KNX
	Instrument ID: HG									
Total/NA	Analysis	5		1			11498	05/23/17 09:42	TSN	TAL KNX
	Instrument ID: FT_Gross									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-11528/10-B

Date Collected: N/A

Matrix: Air

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Air Train Vol.			1 Sample	50 mL	11528	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (KMnO4)			25 mL	50 mL	11529	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 12:31	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-11538/9-B

Date Collected: N/A

Matrix: Air

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Air Train Vol.			1 Sample	50 mL	11538	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (Empty)			2.5 mL	50 mL	11539	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 11:59	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-11540/10-B

Date Collected: N/A

Matrix: Air

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Air Train Vol.			1 Sample	50 mL	11540	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (HCl)			10 mL	50 mL	11541	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 13:03	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-11542/10-B

Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Air Train Vol.			1 Sample	100 mL	11542	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (BH)			2.5 mL	50 mL	11543	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 11:28	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: Method Blank
Lab Sample ID: MB 140-11655/9-B

Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	AT Prep (FH)			1 Sample	100 mL	11655	05/24/17 12:00	PJB	TAL KNX
Total/NA	Cleanup	AT Prep FH			5 mL	50 mL	11656	05/30/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11672	05/30/17 15:04	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: Method Blank
Lab Sample ID: MB 180-211848/8-A

Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	AT Prep (BH)			1 Sample	100 mL	211848	05/22/17 09:22		TAL PIT
Total/NA	Analysis	29/6020A		1	1.0 mL	1.0 mL	216315	07/05/17 18:41	WTR	TAL PIT
	Instrument ID: M									

Client Sample ID: Method Blank
Lab Sample ID: MB 180-212181/9-A ^5

Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	AT Prep (FH)			1 Sample	100 mL	212181	05/24/17 12:00		TAL PIT
Total/NA	Analysis	29/6020A		5	1.0 mL	1.0 mL	216315	07/05/17 20:02	WTR	TAL PIT
	Instrument ID: M									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-11528/11-B

Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Air Train Vol.			1 Sample	50 mL	11528	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (KMnO4)			25 mL	50 mL	11529	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 12:33	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-11538/10-B

Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Air Train Vol.			1 Sample	50 mL	11538	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (Empty)			2.5 mL	50 mL	11539	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 12:02	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-11540/11-B

Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Air Train Vol.			1 Sample	50 mL	11540	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (HCl)			10 mL	50 mL	11541	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 13:05	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-11542/11-B

Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Air Train Vol.			1 Sample	100 mL	11542	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (BH)			2.5 mL	50 mL	11543	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 11:30	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 140-11655/10-B

Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	AT Prep (FH)			1 Sample	100 mL	11655	05/24/17 12:00	PJB	TAL KNX
Total/NA	Cleanup	AT Prep FH			5 mL	50 mL	11656	05/30/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11672	05/30/17 15:07	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: Lab Control Sample
Lab Sample ID: LCS 180-211848/9-A

Date Collected: N/A
Matrix: Air
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	AT Prep (BH)			1 Sample	100 mL	211848	05/22/17 09:22		TAL PIT
Total/NA	Analysis	29/6020A		1	1.0 mL	1.0 mL	216315	07/05/17 18:49	WTR	TAL PIT
	Instrument ID: M									

Client Sample ID: Lab Control Sample
Date Collected: N/A
Date Received: N/A

Lab Sample ID: LCS 180-212181/10-A ^5
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	AT Prep (FH)			1 Sample	100 mL	212181	05/24/17 12:00		TAL PIT
Total/NA	Analysis	29/6020A		5	1.0 mL	1.0 mL	216315	07/05/17 20:06	WTR	TAL PIT
	Instrument ID: M									

Client Sample ID: Lab Control Sample Dup
Date Collected: N/A
Date Received: N/A

Lab Sample ID: LCSD 140-11655/11-B
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	AT Prep (FH)			1 Sample	100 mL	11655	05/24/17 12:00	PJB	TAL KNX
Total/NA	Cleanup	AT Prep FH			5 mL	50 mL	11656	05/30/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11672	05/30/17 15:09	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: Lab Control Sample Dup
Date Collected: N/A
Date Received: N/A

Lab Sample ID: LCSD 180-211848/10-A
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	AT Prep (BH)			1 Sample	100 mL	211848	05/22/17 09:22		TAL PIT
Total/NA	Analysis	29/6020A		1	1.0 mL	1.0 mL	216315	07/05/17 18:57	WTR	TAL PIT
	Instrument ID: M									

Client Sample ID: Lab Control Sample Dup
Date Collected: N/A
Date Received: N/A

Lab Sample ID: LCSD 180-212181/11-A ^5
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	AT Prep (FH)			1 Sample	100 mL	212181	05/24/17 12:00		TAL PIT
Total/NA	Analysis	29/6020A		5	1.0 mL	1.0 mL	216315	07/05/17 20:10	WTR	TAL PIT
	Instrument ID: M									

Client Sample ID: R-2424 F2 R1 M29 BH IMP
Date Collected: 05/08/17 00:00
Date Received: 05/16/17 13:05

Lab Sample ID: 140-8115-4 MS
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Air Train Vol.			1 Sample	100 mL	11542	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (BH)			2.5 mL	50 mL	11543	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 11:35	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: R-2424 F2 R1 M29 BH IMP — Lab Sample ID: 140-8115-4 MSD

Date Collected: 05/08/17 00:00 — **Matrix: Air**
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Air Train Vol.			1 Sample	100 mL	11542	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (BH)			2.5 mL	50 mL	11543	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 11:37	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: R-2425 F2 R1 M29 EMPTY IMP — Lab Sample ID: 140-8115-5 MS

Date Collected: 05/08/17 00:00 — **Matrix: Air**
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Air Train Vol.			1 Sample	45 mL	11538	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (Empty)			2.5 mL	50 mL	11539	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 12:07	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: R-2425 F2 R1 M29 EMPTY IMP — Lab Sample ID: 140-8115-5 MSD

Date Collected: 05/08/17 00:00 — **Matrix: Air**
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Air Train Vol.			1 Sample	45 mL	11538	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (Empty)			2.5 mL	50 mL	11539	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 12:10	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: R-2426 F2 R1 M29 KMNO4/H2SO4 IMP — Lab Sample ID: 140-8115-6 MS

Date Collected: 05/08/17 00:00 — **Matrix: Air**
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Air Train Vol.			1 Sample	400 mL	11528	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (KMnO4)			25 mL	50 mL	11529	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 12:38	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: R-2426 F2 R1 M29 KMNO4/H2SO4 IMP — Lab Sample ID: 140-8115-6 MSD

Date Collected: 05/08/17 00:00 — **Matrix: Air**
Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Air Train Vol.			1 Sample	400 mL	11528	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (KMnO4)			25 mL	50 mL	11529	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 12:40	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: R-2427 F2 R1 M29 HCL RINSE

Lab Sample ID: 140-8115-7 MS

Date Collected: 05/08/17 00:00

Matrix: Air

Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Air Train Vol.			1 Sample	290 mL	11540	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (HCl)			10 mL	50 mL	11541	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 13:10	PJB	TAL KNX
	Instrument ID: HG									

Client Sample ID: R-2427 F2 R1 M29 HCL RINSE

Lab Sample ID: 140-8115-7 MSD

Date Collected: 05/08/17 00:00

Matrix: Air

Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Pre Prep	Air Train Vol.			1 Sample	290 mL	11540	05/25/17 08:00	PJB	TAL KNX
Total/NA	Prep	AT Prep (HCl)			10 mL	50 mL	11541	05/25/17 09:00	PJB	TAL KNX
Total/NA	Analysis	29/7470A		1			11616	05/26/17 13:13	PJB	TAL KNX
	Instrument ID: HG									

Laboratory References:

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Accreditation/Certification Summary

Client: URS Corporation
Project/Site: Suncoke - M5/29

TestAmerica Job ID: 140-8115-1

Laboratory: TestAmerica Knoxville

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		N/A	
ANAB	DoD ELAP		L2311	02-13-19
Arkansas DEQ	State Program	6	88-0688	06-16-18
California	State Program	9	2423	06-30-18
Colorado	State Program	8	TN00009	02-28-18
Connecticut	State Program	1	PH-0223	09-30-17
Florida	NELAP	4	E87177	06-30-18
Georgia	State Program	4	906	04-13-20
Hawaii	State Program	9	N/A	04-13-18
Kansas	NELAP	7	E-10349	10-31-17
Kentucky (DW)	State Program	4	90101	12-31-17
Louisiana	NELAP	6	83979	06-30-18
Louisiana (DW)	NELAP	6	LA160005	12-31-17
Maryland	State Program	3	277	03-31-18
Michigan	State Program	5	9933	04-13-20
Nevada	State Program	9	TN00009	07-31-17
New Jersey	NELAP	2	TN001	06-30-18
New York	NELAP	2	10781	03-31-18
North Carolina (DW)	State Program	4	21705	07-31-17
North Carolina (WW/SW)	State Program	4	64	12-31-17
Ohio VAP	State Program	5	CL0059	11-22-18
Oklahoma	State Program	6	9415	08-31-17
Pennsylvania	NELAP	3	68-00576	12-31-17
Tennessee	State Program	4	2014	04-13-20
Texas	NELAP	6	T104704380-16-9	08-31-17
USDA	Federal		P330-13-00262	08-20-19
Utah	NELAP	8	TN00009	07-31-17
Virginia	NELAP	3	460176	09-14-17
Washington	State Program	10	C593	01-19-18
West Virginia (DW)	State Program	3	9955C	12-31-17
West Virginia DEP	State Program	3	345	04-30-18
Wisconsin	State Program	5	998044300	08-31-17

Laboratory: TestAmerica Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arkansas DEQ	State Program	6	88-0690	06-27-18
California	State Program	9	2891	03-31-18
Connecticut	State Program	1	PH-0688	09-30-18
Florida	NELAP	4	E871008	06-30-18
Illinois	NELAP	5	200005	06-30-18
Kansas	NELAP	7	E-10350	01-31-18
Louisiana	NELAP	6	04041	06-30-18
New Hampshire	NELAP	1	2030	04-04-18
New Jersey	NELAP	2	PA005	06-30-18
New York	NELAP	2	11182	03-31-18
North Carolina (WW/SW)	State Program	4	434	12-31-17
Pennsylvania	NELAP	3	02-00416	04-30-18
South Carolina	State Program	4	89014	04-30-18

Laboratory: TestAmerica Pittsburgh (Continued)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Texas	NELAP	6	T104704528-15-2	03-31-18
US Fish & Wildlife	Federal		LE94312A-1	10-31-17
USDA	Federal		P330-16-00211	06-26-19
Utah	NELAP	8	PA001462015-4	05-31-18
Virginia	NELAP	3	460189	09-14-17
West Virginia DEP	State Program	3	142	01-31-18
Wisconsin	State Program	5	998027800	08-31-17

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 140-8107-1

Job Description: Suncoke Coke ICR - M26A

For:
URS Corporation
105 Mitchell Road, Suite 200
Oak Ridge, TN 37830

Attention: John Carson

Approved for release.
Courtney M Adkins
Project Manager I
5/30/2017 10:42 AM

Courtney M Adkins, Project Manager I
5815 Middlebrook Pike, Knoxville, TN, 37921
(865)291-3000
courtney.adkins@testamericainc.com
05/30/2017

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Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: URS Corporation
Project/Site: Suncoke Coke ICR - M26A

TestAmerica Job ID: 140-8107-1

Method	Method Description	Protocol	Laboratory
0050/26A	Hydrogen Halide and Halogen Emissions/Stationary Sources (Mod)	SW846	TAL KNX

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Sample Summary

Client: URS Corporation
Project/Site: Suncoke Coke ICR - M26A

TestAmerica Job ID: 140-8107-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
140-8107-1	R-2430 R1 M26A IMPINGER	Air	05/05/17 00:00	05/16/17 13:05
140-8107-2	R-2475 R2 M26A IMPINGER	Air	05/05/17 00:00	05/16/17 13:05
140-8107-3	R-2520 R3 M26A IMPINGER	Air	05/06/17 00:00	05/16/17 13:05
140-8107-4	R-2592 QC M26A IMPINGER	Air	05/06/17 00:00	05/16/17 13:05

Job Narrative
140-8107-1

Sample Receipt

The samples were received on May 16, 2017 at 1:05 PM. The samples arrived in good condition and properly preserved. The temperature of the cooler at receipt was 22.0° C.

Quality Control and Data Interpretation

Unless otherwise noted, all holding times, and QC criteria were met and the test results shown in this report meet all applicable NELAC requirements.

General Chemistry

Analysis of Stationary Source Emission Samples by Ion Chromatography: Samples were analyzed for chloride and fluoride by ion chromatography using SOP number KNOX-WC-005 (based on EPA methods 9056, 9057 and 26A). Results for the sulfuric acid impinger samples were reported as total µg hydrogen chloride and total µg hydrogen fluoride.

Results were calculated using the following equations:

Hydrogen Fluoride, µg = (Fluoride, µg/mL) × (Sample Volume, mL) × (Molecular Weight HF / Molecular Weight F) × Bench DF

Hydrogen Chloride, µg = (Chloride, µg/mL) × (Sample Volume, mL) × (Molecular Weight HCl / Molecular Weight Cl) × Bench DF

Note: A sample volume of 100 mL was used to convert the results to total µg for the method blanks, laboratory control samples, and client reagent blanks.

For demonstration of analytical method performance on these samples, TestAmerica Knoxville analyzed matrix spikes (MS) and matrix spike duplicates (MSD). Acceptable recoveries of these spikes demonstrate that quantitation from this particular stack gas matrix is accurate and acceptable. Impinger samples containing 0.1N sulfuric acid and 0.1N sodium hydroxide often display matrix interference effects causing poor method performance and possibly giving unreliable data unless the interference is dealt with. Therefore, the samples were diluted in the lab to reduce the interference for a more accurate anion response. The samples may be analyzed at increasing dilutions along with matrix spikes until matrix spikes display acceptable recoveries.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

HPLC/IC

Prep Batch: 11522

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8107-1	R-2430 R1 M26A IMPINGER	Total/NA	Air	0050/26A	
140-8107-2	R-2475 R2 M26A IMPINGER	Total/NA	Air	0050/26A	
140-8107-3	R-2520 R3 M26A IMPINGER	Total/NA	Air	0050/26A	
140-8107-4	R-2592 QC M26A IMPINGER	Total/NA	Air	0050/26A	
MB 140-11522/3-A	Method Blank	Total/NA	Air	0050/26A	
LCS 140-11522/1-A	Lab Control Sample	Total/NA	Air	0050/26A	
LCSD 140-11522/2-A	Lab Control Sample Dup	Total/NA	Air	0050/26A	
140-8107-1 MS	R-2430 R1 M26A IMPINGER	Total/NA	Air	0050/26A	
140-8107-1 MSD	R-2430 R1 M26A IMPINGER	Total/NA	Air	0050/26A	

Analysis Batch: 11556

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8107-1	R-2430 R1 M26A IMPINGER	Total/NA	Air	0050/26A	11522
140-8107-1	R-2430 R1 M26A IMPINGER	Total/NA	Air	0050/26A	11522
140-8107-2	R-2475 R2 M26A IMPINGER	Total/NA	Air	0050/26A	11522
140-8107-2	R-2475 R2 M26A IMPINGER	Total/NA	Air	0050/26A	11522
140-8107-3	R-2520 R3 M26A IMPINGER	Total/NA	Air	0050/26A	11522
140-8107-3	R-2520 R3 M26A IMPINGER	Total/NA	Air	0050/26A	11522
140-8107-4	R-2592 QC M26A IMPINGER	Total/NA	Air	0050/26A	11522
MB 140-11522/3-A	Method Blank	Total/NA	Air	0050/26A	11522
LCS 140-11522/1-A	Lab Control Sample	Total/NA	Air	0050/26A	11522
LCSD 140-11522/2-A	Lab Control Sample Dup	Total/NA	Air	0050/26A	11522
140-8107-1 MS	R-2430 R1 M26A IMPINGER	Total/NA	Air	0050/26A	11522
140-8107-1 MS	R-2430 R1 M26A IMPINGER	Total/NA	Air	0050/26A	11522
140-8107-1 MSD	R-2430 R1 M26A IMPINGER	Total/NA	Air	0050/26A	11522
140-8107-1 MSD	R-2430 R1 M26A IMPINGER	Total/NA	Air	0050/26A	11522

Client Sample ID: R-2430 R1 M26A IMPINGER

Lab Sample ID: 140-8107-1
Matrix: Air
Date Collected: 05/05/17 00:00
Date Received: 05/16/17 13:05
Sample Container: Plastic 1 liter - unpreserved

Method: 0050/26A - Hydrogen Halide and Halogen Emissions/Stationary Sources (Mod)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hydrogen Chloride	166000		48300	20300	ug/Sample		05/24/17 08:06	05/24/17 10:49	1000
Hydrogen Fluoride	4310		990	495	ug/Sample		05/24/17 08:06	05/24/17 10:31	20

Client Sample ID: R-2475 R2 M26A IMPINGER

Lab Sample ID: 140-8107-2
Matrix: Air
Date Collected: 05/05/17 00:00
Date Received: 05/16/17 13:05
Sample Container: Plastic 1 liter - unpreserved

Method: 0050/26A - Hydrogen Halide and Halogen Emissions/Stationary Sources (Mod)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hydrogen Chloride	156000		24900	10500	ug/Sample		05/24/17 08:06	05/24/17 13:33	500
Hydrogen Fluoride	3260		255	128	ug/Sample		05/24/17 08:06	05/24/17 13:15	5

Client Sample ID: R-2520 R3 M26A IMPINGER

Lab Sample ID: 140-8107-3
Matrix: Air
Date Collected: 05/06/17 00:00
Date Received: 05/16/17 13:05
Sample Container: Plastic 1 liter - unpreserved

Method: 0050/26A - Hydrogen Halide and Halogen Emissions/Stationary Sources (Mod)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hydrogen Chloride	187000		13100	5510	ug/Sample		05/24/17 08:06	05/24/17 14:31	250
Hydrogen Fluoride	4620		269	134	ug/Sample		05/24/17 08:06	05/24/17 14:13	5

Client Sample ID: R-2592 QC M26A IMPINGER

Lab Sample ID: 140-8107-4
Matrix: Air
Date Collected: 05/06/17 00:00
Date Received: 05/16/17 13:05
Sample Container: Plastic 1 liter - unpreserved

Method: 0050/26A - Hydrogen Halide and Halogen Emissions/Stationary Sources (Mod)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hydrogen Chloride	ND		20.6	8.64	ug/Sample		05/24/17 08:06	05/24/17 14:48	2
Hydrogen Fluoride	ND		21.1	10.5	ug/Sample		05/24/17 08:06	05/24/17 14:48	2

Default Detection Limits

Client: URS Corporation
Project/Site: Suncoke Coke ICR - M26A

TestAmerica Job ID: 140-8107-1

Method: 0050/26A - Hydrogen Halide and Halogen Emissions/Stationary Sources (Mod)

Prep: 0050/26A

Analyte	RL	MDL	Units	Method
Hydrogen Chloride	10.3	4.32	ug/Sample	0050/26A
Hydrogen Fluoride	10.5	5.27	ug/Sample	0050/26A

Method: 0050/26A - Hydrogen Halide and Halogen Emissions/Stationary Sources (Mod)

Lab Sample ID: MB 140-11522/3-A
Matrix: Air
Analysis Batch: 11556

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 11522

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hydrogen Chloride	ND		10.3	4.32	ug/Sample		05/24/17 08:06	05/24/17 09:55	1
Hydrogen Fluoride	ND		10.5	5.27	ug/Sample		05/24/17 08:06	05/24/17 09:55	1

Lab Sample ID: LCS 140-11522/1-A
Matrix: Air
Analysis Batch: 11556

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 11522

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hydrogen Chloride	77.1	85.03		ug/Sample		110	90 - 110
Hydrogen Fluoride	79.0	85.34		ug/Sample		108	90 - 110

Lab Sample ID: LCSD 140-11522/2-A
Matrix: Air
Analysis Batch: 11556

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 11522

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hydrogen Chloride	77.1	83.41		ug/Sample		108	90 - 110	2	20
Hydrogen Fluoride	79.0	84.99		ug/Sample		108	90 - 110	0	20

Lab Sample ID: 140-8107-1 MS
Matrix: Air
Analysis Batch: 11556

Client Sample ID: R-2430 R1 M26A IMPINGER
Prep Type: Total/NA
Prep Batch: 11522

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Hydrogen Fluoride	4310		9910	14730		ug/Sample		105	75 - 125

Lab Sample ID: 140-8107-1 MS
Matrix: Air
Analysis Batch: 11556

Client Sample ID: R-2430 R1 M26A IMPINGER
Prep Type: Total/NA
Prep Batch: 11522

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Hydrogen Chloride	166000		483000	659500		ug/Sample		102	75 - 125

Lab Sample ID: 140-8107-1 MSD
Matrix: Air
Analysis Batch: 11556

Client Sample ID: R-2430 R1 M26A IMPINGER
Prep Type: Total/NA
Prep Batch: 11522

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hydrogen Fluoride	4310		9910	14560		ug/Sample		103	75 - 125	1	20

Lab Sample ID: 140-8107-1 MSD
Matrix: Air
Analysis Batch: 11556

Client Sample ID: R-2430 R1 M26A IMPINGER
Prep Type: Total/NA
Prep Batch: 11522

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Hydrogen Chloride	166000		483000	664700		ug/Sample		103	75 - 125	1	20

Client Sample ID: R-2430 R1 M26A IMPINGER

Lab Sample ID: 140-8107-1

Date Collected: 05/05/17 00:00

Matrix: Air

Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	0050/26A			1 Sample	470 mL	11522	05/24/17 08:06	JMH	TAL KNX
Total/NA	Analysis	0050/26A		20	10 mL	10 mL	11556	05/24/17 10:31	JMH	TAL KNX
	Instrument ID: 1500									
Total/NA	Prep	0050/26A			1 Sample	470 mL	11522	05/24/17 08:06	JMH	TAL KNX
Total/NA	Analysis	0050/26A		1000	10 mL	10 mL	11556	05/24/17 10:49	JMH	TAL KNX
	Instrument ID: 1500									

Client Sample ID: R-2475 R2 M26A IMPINGER

Lab Sample ID: 140-8107-2

Date Collected: 05/05/17 00:00

Matrix: Air

Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	0050/26A			1 Sample	485 mL	11522	05/24/17 08:06	JMH	TAL KNX
Total/NA	Analysis	0050/26A		5	10 mL	10 mL	11556	05/24/17 13:15	JMH	TAL KNX
	Instrument ID: 1500									
Total/NA	Prep	0050/26A			1 Sample	485 mL	11522	05/24/17 08:06	JMH	TAL KNX
Total/NA	Analysis	0050/26A		500	10 mL	10 mL	11556	05/24/17 13:33	JMH	TAL KNX
	Instrument ID: 1500									

Client Sample ID: R-2520 R3 M26A IMPINGER

Lab Sample ID: 140-8107-3

Date Collected: 05/06/17 00:00

Matrix: Air

Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	0050/26A			1 Sample	510 mL	11522	05/24/17 08:06	JMH	TAL KNX
Total/NA	Analysis	0050/26A		5	10 mL	10 mL	11556	05/24/17 14:13	JMH	TAL KNX
	Instrument ID: 1500									
Total/NA	Prep	0050/26A			1 Sample	510 mL	11522	05/24/17 08:06	JMH	TAL KNX
Total/NA	Analysis	0050/26A		250	10 mL	10 mL	11556	05/24/17 14:31	JMH	TAL KNX
	Instrument ID: 1500									

Client Sample ID: R-2592 QC M26A IMPINGER

Lab Sample ID: 140-8107-4

Date Collected: 05/06/17 00:00

Matrix: Air

Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	0050/26A			1 Sample	100 mL	11522	05/24/17 08:06	JMH	TAL KNX
Total/NA	Analysis	0050/26A		2	10 mL	10 mL	11556	05/24/17 14:48	JMH	TAL KNX
	Instrument ID: 1500									

Client Sample ID: Method Blank
Date Collected: N/A
Date Received: N/A

Lab Sample ID: MB 140-11522/3-A
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	0050/26A			1 Sample	100 mL	11522	05/24/17 08:06	JMH	TAL KNX
Total/NA	Analysis	0050/26A		1	10 mL	10 mL	11556	05/24/17 09:55	JMH	TAL KNX
	Instrument ID: 1500									

Client Sample ID: Lab Control Sample
Date Collected: N/A
Date Received: N/A

Lab Sample ID: LCS 140-11522/1-A
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	0050/26A			1 Sample	100 mL	11522	05/24/17 08:06	JMH	TAL KNX
Total/NA	Analysis	0050/26A		1	10 mL	10 mL	11556	05/24/17 09:20	JMH	TAL KNX
	Instrument ID: 1500									

Client Sample ID: Lab Control Sample Dup
Date Collected: N/A
Date Received: N/A

Lab Sample ID: LCSD 140-11522/2-A
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	0050/26A			1 Sample	100 mL	11522	05/24/17 08:06	JMH	TAL KNX
Total/NA	Analysis	0050/26A		1	10 mL	10 mL	11556	05/24/17 09:37	JMH	TAL KNX
	Instrument ID: 1500									

Client Sample ID: R-2430 R1 M26A IMPINGER
Date Collected: 05/05/17 00:00
Date Received: 05/16/17 13:05

Lab Sample ID: 140-8107-1 MS
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	0050/26A			1 Sample	470 mL	11522	05/24/17 08:06	JMH	TAL KNX
Total/NA	Analysis	0050/26A		20	10 mL	10 mL	11556	05/24/17 11:06	JMH	TAL KNX
	Instrument ID: 1500									
Total/NA	Prep	0050/26A			1 Sample	470 mL	11522	05/24/17 08:06	JMH	TAL KNX
Total/NA	Analysis	0050/26A		1000	10 mL	10 mL	11556	05/24/17 11:41	JMH	TAL KNX
	Instrument ID: 1500									

Client Sample ID: R-2430 R1 M26A IMPINGER
Date Collected: 05/05/17 00:00
Date Received: 05/16/17 13:05

Lab Sample ID: 140-8107-1 MSD
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	0050/26A			1 Sample	470 mL	11522	05/24/17 08:06	JMH	TAL KNX
Total/NA	Analysis	0050/26A		20	10 mL	10 mL	11556	05/24/17 11:23	JMH	TAL KNX
	Instrument ID: 1500									
Total/NA	Prep	0050/26A			1 Sample	470 mL	11522	05/24/17 08:06	JMH	TAL KNX

Client Sample ID: R-2430 R1 M26A IMPINGER
Date Collected: 05/05/17 00:00
Date Received: 05/16/17 13:05

Lab Sample ID: 140-8107-1 MSD
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	0050/26A		1000	10 mL	10 mL	11556	05/24/17 11:58	JMH	TAL KNX
	Instrument ID: 1500									

Laboratory References:

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Accreditation/Certification Summary

Client: URS Corporation
Project/Site: Suncoke Coke ICR - M26A

TestAmerica Job ID: 140-8107-1

Laboratory: TestAmerica Knoxville

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		N/A	
Arkansas DEQ	State Program	6	88-0688	06-16-17
California	State Program	9	2423	06-30-18
Colorado	State Program	8	TN00009	02-28-18
Connecticut	State Program	1	PH-0223	09-30-17
Florida	NELAP	4	E87177	06-30-17
Georgia	State Program	4	906	04-13-20
Hawaii	State Program	9	N/A	04-13-18
Kansas	NELAP	7	E-10349	10-31-17
Kentucky (DW)	State Program	4	90101	12-31-17
L-A-B	DoD ELAP		L2311	02-13-19
Louisiana	NELAP	6	83979	06-30-17
Louisiana (DW)	NELAP	6	LA160005	12-31-17
Maryland	State Program	3	277	03-31-18
Michigan	State Program	5	9933	04-13-17 *
Nevada	State Program	9	TN00009	07-31-17
New Jersey	NELAP	2	TN001	06-30-17
New York	NELAP	2	10781	03-31-18
North Carolina (DW)	State Program	4	21705	07-31-17
North Carolina (WW/SW)	State Program	4	64	12-31-17
Ohio VAP	State Program	5	CL0059	11-22-18
Oklahoma	State Program	6	9415	08-31-17
Pennsylvania	NELAP	3	68-00576	12-31-17
Tennessee	State Program	4	2014	04-13-20
Texas	NELAP	6	T104704380-16-9	08-31-17
USDA	Federal		P330-13-00262	08-20-19
Utah	NELAP	8	TN00009	07-31-17
Virginia	NELAP	3	460176	09-14-17
Washington	State Program	10	C593	01-19-18
West Virginia (DW)	State Program	3	9955C	12-31-17
West Virginia DEP	State Program	3	345	04-30-18
Wisconsin	State Program	5	998044300	08-31-17

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 140-8108-1

Job Description: Suncoke - M8A

For:
URS Corporation
105 Mitchell Road, Suite 200
Oak Ridge, TN 37830

Attention: John Carson

Approved for release.
Courtney M Adkins
Project Manager I
5/30/2017 12:15 PM

Courtney M Adkins, Project Manager I
5815 Middlebrook Pike, Knoxville, TN, 37921
(865)291-3000
courtney.adkins@testamericainc.com
05/30/2017

Table of Contents

Table of Contents

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: URS Corporation
Project/Site: Suncoke - M8A

TestAmerica Job ID: 140-8108-1

Method	Method Description	Protocol	Laboratory
8A	Determination of Sulfuric Acid and Sulfur Dioxide Emissions	EPA	TAL KNX

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Sample Summary

Client: URS Corporation
Project/Site: Suncoke - M8A

TestAmerica Job ID: 140-8108-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
140-8108-1	R-2443 F2 R1 M8A IMP #1	Air	05/05/17 00:00	05/16/17 13:05
140-8108-2	R-2488 F2 R2 M8A IMP #1	Air	05/05/17 00:00	05/16/17 13:05
140-8108-3	R-2533 F2 R3 M8A IMP #1	Air	05/06/17 00:00	05/16/17 13:05
140-8108-4	R-2629 F2 QC M8A RB	Air	05/06/17 00:00	05/16/17 13:05

Job Narrative
140-8108-1

Sample Receipt

The samples were received on May 16, 2017 at 1:05 PM. The samples arrived in good condition and properly preserved. The temperature of the cooler at receipt was 22.0° C.

Quality Control and Data Interpretation

Unless otherwise noted, all holding times, and QC criteria were met and the test results shown in this report meet all applicable NELAC requirements.

General Chemistry

Analysis of Stationary Source Emission Samples by Ion Chromatography: Samples were analyzed for sulfate by ion chromatography using SOP number KNOX-WC-005 (based on EPA methods 9056, 9057 and 8A). Results were reported as total µg sulfuric acid.

Results were calculated using the following equation:

Sulfuric Acid, µg = (Sulfate, µg/mL) × (Sample Volume, mL) × (Molecular Weight Sulfuric Acid / Molecular Weight Sulfate) × Bench DF

Note: A sample volume of 100 mL was used to convert the results to total µg for the method blanks, laboratory control samples, and client reagent blanks.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

HPLC/IC

Prep Batch: 11549

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8108-1	R-2443 F2 R1 M8A IMP #1	Total/NA	Air	8A	
140-8108-2	R-2488 F2 R2 M8A IMP #1	Total/NA	Air	8A	
140-8108-3	R-2533 F2 R3 M8A IMP #1	Total/NA	Air	8A	
140-8108-4	R-2629 F2 QC M8A RB	Total/NA	Air	8A	
MB 140-11549/3-A	Method Blank	Total/NA	Air	8A	
LCS 140-11549/1-A	Lab Control Sample	Total/NA	Air	8A	
LCSD 140-11549/2-A	Lab Control Sample Dup	Total/NA	Air	8A	
140-8108-2 MS	R-2488 F2 R2 M8A IMP #1	Total/NA	Air	8A	
140-8108-2 MSD	R-2488 F2 R2 M8A IMP #1	Total/NA	Air	8A	

Analysis Batch: 11554

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-8108-1	R-2443 F2 R1 M8A IMP #1	Total/NA	Air	8A	11549
140-8108-2	R-2488 F2 R2 M8A IMP #1	Total/NA	Air	8A	11549
140-8108-3	R-2533 F2 R3 M8A IMP #1	Total/NA	Air	8A	11549
140-8108-4	R-2629 F2 QC M8A RB	Total/NA	Air	8A	11549
MB 140-11549/3-A	Method Blank	Total/NA	Air	8A	11549
LCS 140-11549/1-A	Lab Control Sample	Total/NA	Air	8A	11549
LCSD 140-11549/2-A	Lab Control Sample Dup	Total/NA	Air	8A	11549
140-8108-2 MS	R-2488 F2 R2 M8A IMP #1	Total/NA	Air	8A	11549
140-8108-2 MSD	R-2488 F2 R2 M8A IMP #1	Total/NA	Air	8A	11549

Client Sample ID: R-2443 F2 R1 M8A IMP #1

Lab Sample ID: 140-8108-1

Date Collected: 05/05/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Plastic 125mL - unpreserved

Method: 8A - Determination of Sulfuric Acid and Sulfur Dioxide Emissions

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfuric acid	71500		4080	735	ug/Sample		05/24/17 08:00	05/24/17 10:56	100

Client Sample ID: R-2488 F2 R2 M8A IMP #1

Lab Sample ID: 140-8108-2

Date Collected: 05/05/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Plastic 125mL - unpreserved

Method: 8A - Determination of Sulfuric Acid and Sulfur Dioxide Emissions

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfuric acid	47400		7150	1290	ug/Sample		05/24/17 08:00	05/24/17 11:22	100

Client Sample ID: R-2533 F2 R3 M8A IMP #1

Lab Sample ID: 140-8108-3

Date Collected: 05/06/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Plastic 125mL - unpreserved

Method: 8A - Determination of Sulfuric Acid and Sulfur Dioxide Emissions

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfuric acid	41000		4080	735	ug/Sample		05/24/17 08:00	05/24/17 12:24	100

Client Sample ID: R-2629 F2 QC M8A RB

Lab Sample ID: 140-8108-4

Date Collected: 05/06/17 00:00
Matrix: Air
Date Received: 05/16/17 13:05
Sample Container: Plastic 125mL - unpreserved

Method: 8A - Determination of Sulfuric Acid and Sulfur Dioxide Emissions

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfuric acid	ND		102	18.4	ug/Sample		05/24/17 08:00	05/24/17 12:44	1

Default Detection Limits

Client: URS Corporation
Project/Site: Suncoke - M8A

TestAmerica Job ID: 140-8108-1

Method: 8A - Determination of Sulfuric Acid and Sulfur Dioxide Emissions

Prep: 8A

Analyte	RL	MDL	Units	Method
Sulfuric acid	102	18.4	ug/Sample	8A

Method: 8A - Determination of Sulfuric Acid and Sulfur Dioxide Emissions

Lab Sample ID: MB 140-11549/3-A
Matrix: Air
Analysis Batch: 11554

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 11549

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfuric acid	ND		102	18.4	ug/Sample		05/24/17 08:00	05/24/17 10:04	1

Lab Sample ID: LCS 140-11549/1-A
Matrix: Air
Analysis Batch: 11554

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 11549

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfuric acid	255	256.8		ug/Sample		101	90 - 110

Lab Sample ID: LCSD 140-11549/2-A
Matrix: Air
Analysis Batch: 11554

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 11549

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfuric acid	255	253.9		ug/Sample		99	90 - 110	1	20

Lab Sample ID: 140-8108-2 MS
Matrix: Air
Analysis Batch: 11554

Client Sample ID: R-2488 F2 R2 M8A IMP #1
Prep Type: Total/NA
Prep Batch: 11549

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfuric acid	47400		35700	83160		ug/Sample		100	75 - 125

Lab Sample ID: 140-8108-2 MSD
Matrix: Air
Analysis Batch: 11554

Client Sample ID: R-2488 F2 R2 M8A IMP #1
Prep Type: Total/NA
Prep Batch: 11549

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfuric acid	47400		35700	83300		ug/Sample		101	75 - 125	0	20

Client Sample ID: R-2443 F2 R1 M8A IMP #1

Lab Sample ID: 140-8108-1

Date Collected: 05/05/17 00:00

Matrix: Air

Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	8A			1 Sample	40 mL	11549	05/24/17 08:00	JMH	TAL KNX
Total/NA	Analysis	8A		100	10 mL	10 mL	11554	05/24/17 10:56	JMH	TAL KNX
	Instrument ID: 320									

Client Sample ID: R-2488 F2 R2 M8A IMP #1

Lab Sample ID: 140-8108-2

Date Collected: 05/05/17 00:00

Matrix: Air

Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	8A			1 Sample	70 mL	11549	05/24/17 08:00	JMH	TAL KNX
Total/NA	Analysis	8A		100	10 mL	10 mL	11554	05/24/17 11:22	JMH	TAL KNX
	Instrument ID: 320									

Client Sample ID: R-2533 F2 R3 M8A IMP #1

Lab Sample ID: 140-8108-3

Date Collected: 05/06/17 00:00

Matrix: Air

Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	8A			1 Sample	40 mL	11549	05/24/17 08:00	JMH	TAL KNX
Total/NA	Analysis	8A		100	10 mL	10 mL	11554	05/24/17 12:24	JMH	TAL KNX
	Instrument ID: 320									

Client Sample ID: R-2629 F2 QC M8A RB

Lab Sample ID: 140-8108-4

Date Collected: 05/06/17 00:00

Matrix: Air

Date Received: 05/16/17 13:05

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	8A			1 Sample	100 mL	11549	05/24/17 08:00	JMH	TAL KNX
Total/NA	Analysis	8A		1	10 mL	10 mL	11554	05/24/17 12:44	JMH	TAL KNX
	Instrument ID: 320									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-11549/3-A

Date Collected: N/A

Matrix: Air

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	8A			1 Sample	100 mL	11549	05/24/17 08:00	JMH	TAL KNX
Total/NA	Analysis	8A		1	10 mL	10 mL	11554	05/24/17 10:04	JMH	TAL KNX
	Instrument ID: 320									

Lab Chronicle

Client: URS Corporation
Project/Site: Suncoke - M8A

TestAmerica Job ID: 140-8108-1

Client Sample ID: Lab Control Sample
Date Collected: N/A
Date Received: N/A

Lab Sample ID: LCS 140-11549/1-A
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	8A			1 Sample	100 mL	11549	05/24/17 08:00	JMH	TAL KNX
Total/NA	Analysis	8A		1	10 mL	10 mL	11554	05/24/17 09:18	JMH	TAL KNX
	Instrument ID: 320									

Client Sample ID: Lab Control Sample Dup
Date Collected: N/A
Date Received: N/A

Lab Sample ID: LCSD 140-11549/2-A
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	8A			1 Sample	100 mL	11549	05/24/17 08:00	JMH	TAL KNX
Total/NA	Analysis	8A		1	10 mL	10 mL	11554	05/24/17 09:41	JMH	TAL KNX
	Instrument ID: 320									

Client Sample ID: R-2488 F2 R2 M8A IMP #1
Date Collected: 05/05/17 00:00
Date Received: 05/16/17 13:05

Lab Sample ID: 140-8108-2 MS
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	8A			1 Sample	70 mL	11549	05/24/17 08:00	JMH	TAL KNX
Total/NA	Analysis	8A		100	10 mL	10 mL	11554	05/24/17 11:45	JMH	TAL KNX
	Instrument ID: 320									

Client Sample ID: R-2488 F2 R2 M8A IMP #1
Date Collected: 05/05/17 00:00
Date Received: 05/16/17 13:05

Lab Sample ID: 140-8108-2 MSD
Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	8A			1 Sample	70 mL	11549	05/24/17 08:00	JMH	TAL KNX
Total/NA	Analysis	8A		100	10 mL	10 mL	11554	05/24/17 12:05	JMH	TAL KNX
	Instrument ID: 320									

Laboratory References:

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Accreditation/Certification Summary

Client: URS Corporation
Project/Site: Suncoke - M8A

TestAmerica Job ID: 140-8108-1

Laboratory: TestAmerica Knoxville

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
	AFCEE		N/A	
Arkansas DEQ	State Program	6	88-0688	06-16-17
California	State Program	9	2423	06-30-18
Colorado	State Program	8	TN00009	02-28-18
Connecticut	State Program	1	PH-0223	09-30-17
Florida	NELAP	4	E87177	06-30-17
Georgia	State Program	4	906	04-13-20
Hawaii	State Program	9	N/A	04-13-18
Kansas	NELAP	7	E-10349	10-31-17
Kentucky (DW)	State Program	4	90101	12-31-17
L-A-B	DoD ELAP		L2311	02-13-19
Louisiana	NELAP	6	83979	06-30-17
Louisiana (DW)	NELAP	6	LA160005	12-31-17
Maryland	State Program	3	277	03-31-18
Michigan	State Program	5	9933	04-13-17 *
Nevada	State Program	9	TN00009	07-31-17
New Jersey	NELAP	2	TN001	06-30-17
New York	NELAP	2	10781	03-31-18
North Carolina (DW)	State Program	4	21705	07-31-17
North Carolina (WW/SW)	State Program	4	64	12-31-17
Ohio VAP	State Program	5	CL0059	11-22-18
Oklahoma	State Program	6	9415	08-31-17
Pennsylvania	NELAP	3	68-00576	12-31-17
Tennessee	State Program	4	2014	04-13-20
Texas	NELAP	6	T104704380-16-9	08-31-17
USDA	Federal		P330-13-00262	08-20-19
Utah	NELAP	8	TN00009	07-31-17
Virginia	NELAP	3	460176	09-14-17
Washington	State Program	10	C593	01-19-18
West Virginia (DW)	State Program	3	9955C	12-31-17
West Virginia DEP	State Program	3	345	04-30-18
Wisconsin	State Program	5	998044300	08-31-17

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Appendix E
CALIBRATION INFORMATION

Plant Name	Gateway Energy & Coke
Sampling Location	Bypass Stack 5
Date	May 5-6, 2017
CEM Operator	Chandra Sastry
Project Number	60542107

Observed Values

Run No.	Date	Start Time	Stop Time	Start - Stop Time	Reference Method Obs. Value		
					O_2	CO_2	NOX
1	5/5/2017	1520	1641	1520 - 1641	9.6	6.9	33.91
2	5/5/2017	1930	2115	1930 - 2115	7.6	8.1	48.27
3	5/6/2017	1320	1500	1320 - 1500	11.7	5.4	23.51

Bias-Adjusted Values

Run No.	Date	Start Time	Stop Time	Start - Stop Time	Reference Method Adj. Value		
					O_2	CO_2	NOX
1	5/5/2017	1520	1641	1520 - 1641	9.7	7.0	34.61
2	5/5/2017	1930	2115	1930 - 2115	7.7	8.5	49.34
3	5/6/2017	1320	1500	1320 - 1500	11.7	5.5	24.04

RM Sample Data

CEM CALIBRATION DATA

Sampling Location	Bypass Stack 5
Date	5-May-17

Plant Name	Gateway Energy & Coke
Plant Rep.	Chris Decioccio
Team Leader	John Carson
CEM Operator	Chandra Sastry
Project Number	60542107

	Analyzer #	Cal Span
O2	05230A1	20.95
CO2	11047	20.61
NOX		91.48

Data to be Entered by Operator

(Pre Run n+1) = (Post Run n) unless overridden

	Calibration Gas Specification (% of Span)	CALIBRATION ERROR CHECK			SYSTEM CAL CHECK					
		Calibration Value (% or ppm)	Cylinder Number (1)	Analyzer Calibration Response	Pre Run 1 System Response	Post Run 1 System Response	Pre Run 2 System Response	Post Run 2 System Response	Pre Run 3 System Response	Post Run 3 System Response
O2 Zero	0	0	UHP Nitrogen	-0.10	-0.16	-0.22	-0.22	-0.22	-0.22	-0.19
O2 Low	NR									
O2 Mid	40-60	9.85	XC033319B	9.92	9.83	9.73	9.73	9.76	9.76	9.81
O2 High	100	20.95	EB0039392	20.85						
CO2 Zero	0	0	UHP Nitrogen	0.05	0.16	0.18	0.18	0.15	0.15	0.23
CO2 Low	NR									
CO2 Mid	40-60	10.25	XC033319B	10.01	9.91	9.93	9.93	9.66	9.66	10.19
CO2 High	100	20.61	EB0039392	20.58						
NOX Zero	0	0	UHP Nitrogen	0.10	0.20	0.40	0.40	0.40	0.40	0.20
NOX Low	NR									
NOX Mid	40-60	45.82	CC417042	45.40	44.40	45.20	45.20	44.50	44.50	44.60
NOX High	100	91.48	CC220278	92.50						

CEM Data Correction Data Sheet

Plant Name	Gateway Energy & Coke
Sampling Location	Bypass Stack 5
Date	5-May-17
CEM Operator	Chandra Sastry
Project Number	60542107
Pollutant	O_2

Run No.	Start Time	Stop Time	Obs. Conc. (% or ppm)	Calibration Data			Calibration Corrected Data (% or ppm)
				Cma	Co	Cm	
1	1520	1641	9.6	9.9	-0.2	9.8	9.7
2	1930	2115	7.6	9.9	-0.2	9.7	7.7
3	1320	1500	11.7	9.9	-0.2	9.8	11.7

Calibration Error Correction

Cgas=(Cobs-Co)*(Cma/(Cm-Co))

O2 Corrdata

CEM Data Correction Data Sheet

Plant Name	Gateway Energy & Coke
Sampling Location	Bypass Stack 5
Date	5-May-17
CEM Operator	Chandra Sastry
Project Number	60542107
Pollutant	CO_2

Run No.	Start Time	Stop Time	Obs. Conc. (% or ppm)	Calibration Data			Calibration Corrected Data (% or ppm)
				Cma	Co	Cm	
1	1520	1641	6.9	10.3	0.2	9.9	7.0
2	1930	2115	8.1	10.3	0.2	9.8	8.5
3	1320	1500	5.4	10.3	0.2	9.9	5.5

Calibration Error Correction

Cgas=(Cobs-Co)*(Cma/(Cm-Co))

CEM Data Correction Data Sheet

Plant Name	Gateway Energy & Coke
Sampling Location	Bypass Stack 5
Date	5-May-17
CEM Operator	Chandra Sastry
Project Number	60542107
Pollutant	NOX

Run No.	Start Time	Stop Time	Obs. Conc. (% or ppm)	Calibration Data			Calibration Corrected Data (% or ppm)
				Cma	Co	Cm	
1	1520	1641	33.9	45.8	0.3	44.8	34.6
2	1930	2115	48.3	45.8	0.4	44.9	49.3
3	1320	1500	23.5	45.8	0.3	44.6	24.0

Calibration Error Correction

Cgas=(Cobs-Co)*(Cma/(Cm-Co))

NOX Corrdata

CEM CALIBRATION DATA

Sampling Location	Bypass Stack 5
Date	5-May-17
Run Number	1
Start Time	41398
Stop Time	1520

Plant Name	Gateway Energy & Coke
Plant Rep.	Chris Decioccio
Team Leader	John Carson
CEM Operator	Chandra Sastry
Project Number	60542107

	Analyzer Number	Calibration Span
O2	05230A1	20.95
CO2	11047	20.61
NOX		91.48

	Calibration Gas Specification (% of Span)	CALIBRATION ERROR CHECK				SYSTEM CAL CHECK					Calibration Correction Factors
						Pre Run 1		Post Run 1			
		Calibration Value (% or ppm)	Cylinder Number (1)	Analyzer Calibration Response	Difference (% of Span)	System Response	Syst. Bias (% of Span)	System Response	Syst. Bias (% of Span)	Drift (% of Span)	
O2 Zero	0	0	UHP Nitrogen	-0.1	-0.48%	-0.16	-0.29%	-0.22	-0.57%	-0.29%	-Co=0.2
O2 Low	NR										
O2 Mid	40-60	9.85	XC033319B	9.92	0.33%	9.83	-0.43%	9.73	-0.91%	-0.48%	Cm=9.8
O2 High	100	20.95	EB0039392	20.85	-0.48%						
CO2 Zero	0	0	UHP Nitrogen	0.05	0.24%	0.16	0.53%	0.18	0.63%	0.10%	Co=0.2
CO2 Low	NR										
CO2 Mid	40-60	10.25	XC033319B	10.01	-1.16%	9.91	-0.49%	9.93	-0.39%	0.10%	Cm=9.9
CO2 High	100	20.61	EB0039392	20.58	-0.15%						
NOX Zero	0	0	UHP Nitrogen	0.1	0.01%	0.2	0.11%	0.4	0.33%	0.22%	Co=0.3
NOX Low	NR										
NOX Mid	40-60	45.82	CC417042	45.4	-0.04%	44.4	-1.09%	45.2	-0.22%	0.87%	Cm=44.8
NOX High	100	91.48	CC220278	92.5	0.10%						

$$Calibration\ Error = \left(\frac{Analyzer\ Response\ -\ Calibration\ Value}{Analyzer\ Span}\right) \times 100\ ;\ \text{allowable error} = \pm 2\%$$

$$System\ Bias = \left(\frac{System\ Response\ -\ Analyzer\ Response}{Analyzer\ Span}\right) \times 100\ ;\ \text{allowable error} = \pm 5\%$$

$$Drift = \left(\frac{Post\ Test\ System\ Response\ -\ Pre\ Test\ System\ Response}{Analyzer\ Span}\right) \times 100\ ;\ \text{allowable error} = \pm 3\%$$

$$C_o = \left(\frac{Pre\ Test\ System\ Zero\ Response + Post\ Test\ System\ Zero\ Response}{2}\right)$$

$$C_m = \left(\frac{Pre\ Test\ System\ Upscale\ Response + Post\ Test\ System\ Upscale\ Response}{2}\right)$$

CEM CALIBRATION DATA

Sampling Location	Bypass Stack 5
Date	5-May-17
Run Number	2
Start Time	41398
Stop Time	1930

Plant Name	Gateway Energy & Coke
Plant Rep.	Chris Decioccio
Team Leader	John Carson
CEM Operator	Chandra Sastry
Project Number	60542107

	Analyzer Number	Calibration Span
O2	05230A1	20.95
CO2	11047	20.61
NOX		91.48

	Calibration Gas Specification (% of Span)	CALIBRATION ERROR CHECK				SYSTEM CAL CHECK					Calibration Correction Factors
		Calibration Value (% or ppm)	Cylinder Number (1)	Analyzer Calibration Response	Difference (% of Span)	Pre Run 2 System Response	Pre Run 2 Syst. Bias (% of Span)	Post Run 2 System Response	Post Run 2 Syst. Bias (% of Span)	Drift (% of Span)	
O2 Zero	0	0	UHP Nitrogen	-0.1	-0.48%	-0.22	-0.57%	-0.22	-0.57%	0.00%	-Co=0.2
O2 Low	NR										
O2 Mid	40-60	9.85	XC033319B	9.92	0.33%	9.73	-0.91%	9.76	-0.76%	0.14%	Cm=9.7
O2 High	100	20.95	EB0039392	20.85	-0.48%						
CO2 Zero	0	0	UHP Nitrogen	0.05	0.24%	0.18	0.63%	0.15	0.49%	-0.15%	Co=0.2
CO2 Low	NR										
CO2 Mid	40-60	10.25	XC033319B	10.01	-1.16%	9.93	-0.39%	9.66	-1.70%	-1.31%	Cm=9.8
CO2 High	100	20.61	EB0039392	20.58	-0.15%						
NOX Zero	0	0	UHP Nitrogen	0.1	0.01%	0.4	0.33%	0.4	0.33%	0.00%	Co=0.4
NOX Low	NR										
NOX Mid	40-60	45.82	CC417042	45.4	-0.04%	45.2	-0.22%	44.5	-0.98%	-0.77%	Cm=44.9
NOX High	100	91.48	CC220278	92.5	0.10%						

$$Calibration\ Error = \left(\frac{Analyzer\ Response\ -\ Calibration\ Value}{Analyzer\ Span}\right) \times 100\ ;\ \text{allowable error} = \pm 2\%$$

$$System\ Bias = \left(\frac{System\ Response\ -\ Analyzer\ Response}{Analyzer\ Span}\right) \times 100\ ;\ \text{allowable error} = \pm 5\%$$

$$Drift = \left(\frac{Post\ Test\ System\ Response\ -\ Pre\ Test\ System\ Response}{Analyzer\ Span}\right) \times 100\ ;\ \text{allowable error} = \pm 3\%$$

$$C_0 = \left(\frac{Pre\ Test\ System\ Zero\ Response + Post\ Test\ System\ Zero\ Response}{2}\right)$$

$$C_m = \left(\frac{Pre\ Test\ System\ Upscale\ Response + Post\ Test\ System\ Upscale\ Response}{2}\right)$$

CEM CALIBRATION DATA

Sampling Location	Bypass Stack 5
Date	6-May-17
Run Number	3
Start Time	41399
Stop Time	1320

Plant Name	Gateway Energy & Coke
Plant Rep.	Chris Decioccio
Team Leader	John Carson
CEM Operator	Chandra Sastry
Project Number	60542107

	Analyzer Number	Calibration Span
O2	05230A1	20.95
CO2	11047	20.61
NOX		91.48

	Calibration Gas Specification (% of Span)	CALIBRATION ERROR CHECK				SYSTEM CAL CHECK					
						Pre Run 3		Post Run 3			
		Calibration Value (% or ppm)	Cylinder Number (1)	Analyzer Calibration Response	Difference (% of Span)	System Response	Syst. Bias (% of Span)	System Response	Syst. Bias (% of Span)	Drift (% of Span)	Calibration Correction Factors
O2 Zero	0	0	UHP Nitrogen	-0.1	-0.48%	-0.22	-0.57%	-0.19	-0.43%	0.14%	-Co=0.2
O2 Low	NR										
O2 Mid	40-60	9.85	XC033319B	9.92	0.33%	9.76	-0.76%	9.81	-0.53%	0.24%	Cm=9.8
O2 High	100	20.95	EB0039392	20.85	-0.48%						
CO2 Zero	0	0	UHP Nitrogen	0.05	0.24%	0.15	0.49%	0.23	0.87%	0.39%	Co=0.2
CO2 Low	NR										
CO2 Mid	40-60	10.25	XC033319B	10.01	-1.16%	9.66	-1.70%	10.19	0.87%	2.57%	Cm=9.9
CO2 High	100	20.61	EB0039392	20.58	-0.15%						
NOX Zero	0	0	UHP Nitrogen	0.1	0.01%	0.4	0.33%	0.2	0.11%	-0.22%	Co=0.3
NOX Low	NR										
NOX Mid	40-60	45.82	CC417042	45.4	-0.04%	44.5	-0.98%	44.6	-0.87%	0.11%	Cm=44.6
NOX High	100	91.48	CC220278	92.5	0.10%						

$$Calibration\ Error = \left(\frac{Analyzer\ Response\ -\ Calibration\ Value}{Analyzer\ Span}\right) \times 100\ ;\ \text{allowable error} = \pm 2\%$$

$$System\ Bias = \left(\frac{System\ Response\ -\ Analyzer\ Response}{Analyzer\ Span}\right) \times 100\ ;\ \text{allowable error} = \pm 5\%$$

$$Drift = \left(\frac{Post\ Test\ System\ Response\ -\ Pre\ Test\ System\ Response}{Analyzer\ Span}\right) \times 100\ ;\ \text{allowable error} = \pm 3\%$$

$$C_o = \left(\frac{Pre\ Test\ System\ Zero\ Response + Post\ Test\ System\ Zero\ Response}{2}\right)$$

$$C_m = \left(\frac{Pre\ Test\ System\ Upscale\ Response + Post\ Test\ System\ Upscale\ Response}{2}\right)$$

NO_2-NO Converter Efficiency Test (NO_2 Cylinder Method)

Date:	5/4/2017	Location:	Bypass Stack 5
Project:	GECC CD Test	Technician:	Chandra Sastry
Analyzer:	Thermo Environmental	Operating Range:	0-100
Model:	42i-HL		
S/N:	828232281		

Cylinder Number	Cal Gas Concentration	NO_x Analyzer Response in Direct Cal Mode
CC504828	50.19	45.4

$$\text{Converter Efficiency} = \frac{C_{Dir}}{C_v} \times 100$$

Converter Efficiency = **90.5** % (Must be greater than or equal to 90 percent)

Procedures

1. Calibrate analyzer
2. Introduce a 40 to 60 ppmv NO_2 calibration gas cylinder to the analyzer in direct cal mode and record the NO_x response.
3. Calculate efficiency.

NOX Conv Test 050417

Time	O2	CO2	NOX
9:43	-0.22	0.05	0.1
9:44	13.32	0.05	10.6
9:45	20.64	0.05	34.7
9:46	20.73	0.05	38.5
9:47	20.78	0.04	40
9:48	20.8	0.05	40.6
9:49	20.83	0.05	41
9:50	20.86	0.05	41.5
9:51	20.88	0.05	42.3
9:52	20.9	0.05	42.9
9:53	20.97	0.05	43.3
9:54	21.01	0.05	43.7
9:55	21.1	0.05	44
9:56	21.44	0.05	44.3
9:57	21.38	0.05	44.5
9:58	21.45	0.05	44.7
9:59	21.39	0.05	44.8
10:00	21.41	0.05	45
10:01	21.65	0.05	45.1
10:02	21.99	0.06	45.3
10:03	22.29	0.08	45.4
10:04	22.55	0.09	45.4

Direct Cal 2 for 050517

Time	O2	CO2	NOX
12:20	9.71	9.99	0.2
12:21	1.78	1.63	42.8
12:22	-0.14	0.22	91.9
12:23	-0.2	0.15	92.5
12:24	-0.19	0.15	79.5
12:25	-0.25	0.09	46.1
12:26	-0.25	0.08	45.4
12:27	-0.21	0.1	32.9
12:28	-0.25	0.09	2.3
12:29	-0.25	0.09	1.7
12:30	-0.13	0.09	2.7
12:31	-0.26	0.08	0.8
12:32	-0.26	0.07	0.5
12:33	0.12	0.05	0.6
12:34	0.14	0.05	0.4
12:35	0.34	0.06	0.2
12:36	1.15	0.06	0.1
12:37	2.09	0.07	1
12:38	-0.01	0.19	0.4
12:39	0.18	0.18	0.1

System Cal 2 for 050517

Time	O2	CO2	NOX
12:41	8.59	5.62	29.5
12:42	0.58	0.33	2.8
12:43	-0.22	0.26	0.3
12:44	-0.23	0.23	0.2
12:45	-0.56	0.23	0.2
12:46	-0.23	0.22	0.2
12:47	-0.24	0.21	31.3
12:48	-0.24	0.19	44.5
12:49	-0.24	0.16	44.6
12:50	-0.24	0.15	44.4
12:51	-0.24	0.14	14.1
12:52	-0.25	0.14	0.7
12:53	-0.25	0.14	0.6
12:54	-0.25	0.14	0.5
12:55	-0.25	0.13	0.7
12:56	-0.25	0.13	1.2
12:57	-0.26	0.13	0.2
12:58	-0.26	0.13	0.2

Run 1 Data

Time	O2	CO2	NOX
15:20	9.37	7.02	32.8
15:21	9.43	6.95	32.7
15:22	9.4	7	32.3
15:23	9.21	7.18	32.5
15:24	9.21	7.16	32.3
15:25	9.44	6.95	32.4
15:26	9.45	6.95	33.4
15:27	9.35	7.08	33
15:28	9.23	7.22	32.4
15:29	9.18	7.26	32.8
15:30	9.24	7.23	32.7
15:31	9.29	7.15	32.9
15:32	9.3	7.15	32.7
15:33	9.51	6.92	33.7
15:34	9.42	7.01	34.7
15:35	9.39	7.05	34.4
15:36	9.36	7.07	34
15:37	9.52	6.93	33.6
15:38	9.48	6.96	33.5
15:39	9.45	6.98	33.7
15:40	9.58	6.86	34.3
15:41	9.5	6.94	34.6
15:42	9.38	7.06	33.6
15:43	9.51	6.93	33.7
15:44	9.52	6.94	33.6
15:45	9.45	7	33.5
15:46	9.48	6.97	33.6
15:47	9.51	6.96	34.5
15:48	9.52	6.96	34.8
15:49	9.49	6.99	34.5
15:50	9.45	7.03	34.3
15:51	9.55	6.93	34.9
15:52	9.66	6.83	34.8
15:53	9.73	6.76	35.1
15:54	9.68	6.81	34.9
15:55	9.75	6.75	33.9
15:56	9.67	6.82	34.1
15:57	9.67	6.82	34.1
15:58	9.58	6.92	33.8
15:59	9.49	7.01	34.2
16:00	9.55	6.94	33.4
16:01	9.58	6.89	33.3
16:02	9.77	6.68	34.5
16:03	9.73	6.71	34.3
16:04	9.73	6.69	34.7
16:05	9.9	6.53	35.1
16:06	9.87	6.56	35.5
16:07	9.71	6.73	34.7
16:08	9.84	6.59	33.8
16:09	9.83	6.6	34.2
16:10	9.83	6.63	34.7
16:11	9.67	6.79	34.8
16:12	9.67	6.77	34.1
16:13	9.77	6.69	34.4

Run 1 Data

16:14	9.71	6.74	34.7
16:15	9.8	6.68	34.4
16:16	9.66	6.79	33.8
16:17	9.7	6.73	34.1
16:18	9.73	6.73	34.4
16:19	9.65	6.81	34
16:20	9.53	6.93	33.6
16:21	9.48	6.98	33.5
16:22	9.47	6.99	33.2
16:23	9.63	6.83	33.4
16:24	9.61	6.87	33.7
16:25	9.65	6.82	33.4
16:26	9.63	6.85	34
16:27	9.68	6.79	34.5
16:28	9.7	6.76	33.7
16:29	9.73	6.73	33.3
16:30	9.8	6.66	34.1
16:31	9.78	6.7	34.1
16:32	9.74	6.75	34
16:33	9.66	6.8	33.8
16:34	9.82	6.63	34
16:35	9.71	6.77	33.9
16:36	9.67	6.81	34.9
16:37	9.62	6.85	35.1
16:38	9.61	6.87	35
16:39	9.67	6.82	34.6
16:40	9.84	6.65	33.4
16:41	9.63	6.83	33.5
Average	9.6	6.9	33.9

Post Run 1 050517

Time	O2	CO2	NOX
17:20	10.13	6.31	35.9
17:21	10.11	6.37	35.1
17:22	10.23	6.25	36.3
17:23	7.11	4.23	34.9
17:24	-0.18	0.25	6.4
17:25	-0.22	0.18	0.4
17:26	-0.23	0.15	0.3
17:27	-0.24	0.14	0.3
17:28	3.46	3.69	0.3
17:29	9.71	9.85	0.3
17:30	9.73	9.93	0.3
17:31	9.74	9.98	0.3
17:32	9.74	10.01	0.3
17:33	6.2	5.06	13.2
17:34	-0.19	0.3	41.9
17:35	-0.22	0.2	45
17:36	-0.23	0.17	45.2
17:37	-0.24	0.15	45.1
17:38	-0.23	0.16	44.5
17:39	-0.25	0.13	14.7
17:40	-0.25	0.16	0.9
17:41	-0.26	0.31	0.7
17:42	-0.26	0.39	0.4
17:43	0.65	0.93	0.7
17:44	-0.24	0.23	2.7
17:45	-0.25	0.12	0.5
17:46	-0.25	0.11	0.5
17:47	-0.25	0.13	0.5
17:48	-0.26	0.18	0.4

Run 2 Data

Time	O2	CO2	NOX
19:30	10.47	5.86	33.5
19:31	10.7	5.64	33.1
19:32	10.74	5.62	31.7
19:33	10.77	5.61	32.5
19:34	10.46	5.91	33.6
19:35	10.38	5.95	33.1
19:36	10.35	5.97	33.5
19:37	9.87	6.49	36.8
19:38	9.88	6.42	38.7
19:39	9.93	6.36	37.8
19:40	9.77	6.53	37
19:41	9.36	6.91	38.2
19:42	9.05	7.12	37.6
19:43	8.93	7.27	38.7
19:44	8.44	7.71	45.2
19:45	8.47	7.66	44.7
19:46	8.48	7.62	43.9
19:47	8.38	7.74	44.6
19:48	8.03	8.03	45.3
19:49	7.79	8.18	44.4
19:50	7.67	8.29	44.5
19:51	7.25	8.69	51.6
19:52	7.5	8.44	53.2
19:53	7.64	8.24	50.2
19:54	7.66	8.24	46.3
19:55	7.5	8.38	46.7
19:56	7.28	8.54	46.9
19:57	7	8.72	48.8
19:58	6.76	8.97	51.8
19:59	6.69	9.02	57
20:00	7	8.69	54.9
20:01	7.05	8.64	50.9
20:02	6.9	8.78	51.1
20:03	6.83	8.81	50.8
20:04	6.8	8.82	50.9
20:05	6.62	9	52
20:06	6.41	9.15	53.1
20:07	6.66	8.92	52.7
20:08	6.63	8.96	51.7
20:09	6.78	8.83	50.8
20:10	6.7	8.87	51.4
20:11	6.8	8.78	50.7
20:12	6.82	8.76	50.2
20:13	6.69	8.87	50.3
20:14	6.54	8.97	50.5
20:15	6.66	8.87	49.9
20:16	6.69	8.84	49.4
20:17	6.53	8.96	50.7
20:18	6.6	8.94	50.1
20:19	6.56	8.92	50.2
20:20	6.54	8.94	50.3
20:21	6.69	8.83	50.2
20:22	6.66	8.83	50.1
20:23	6.73	8.78	49.9

Run 2 Data

20:24	6.64	8.85	50.2
20:25	6.69	8.77	50.1
20:26	6.58	8.89	50.3
20:27	6.58	8.88	50.9
20:28	6.7	8.77	50.5
20:29	6.79	8.68	50.5
20:30	6.91	8.61	50.6
20:31	6.97	8.54	51.1
20:32	6.99	8.5	50.7
20:33	6.94	8.56	51.1
20:34	7.01	8.5	51.1
20:35	7.07	8.46	50.8
20:36	7.02	8.5	51
20:37	7.03	8.48	51
20:38	7.05	8.46	50.9
20:39	7.29	8.28	50.6
20:40	7.16	8.37	51.3
20:41	7.11	8.43	51.3
20:42	7.01	8.5	51.2
20:43	7.07	8.44	51
20:44	7.16	8.37	50.9
20:45	7.18	8.37	51.6
20:46	7.29	8.25	51
20:47	7.43	8.14	50.6
20:48	7.34	8.22	50.6
20:49	7.37	8.18	50.8
20:50	7.39	8.17	51
20:51	7.43	8.15	50.4
20:52	7.33	8.23	51.3
20:53	7.45	8.12	50.9
20:54	7.42	8.16	50.7
20:55	7.43	8.14	51.1
20:56	7.53	8.06	50.8
20:57	7.59	7.99	50.3
20:58	7.67	7.93	50.5
20:59	7.71	7.89	50
21:00	7.67	7.94	50.2
21:01	7.62	7.98	50.5
21:02	7.68	7.92	50.5
21:03	7.7	7.9	50.6
21:04	7.75	7.87	50
21:05	7.82	7.8	49.8
21:06	7.74	7.88	50.5
21:07	7.76	7.84	50.5
21:08	7.85	7.77	50.2
21:09	7.9	7.73	50.3
21:10	7.95	7.69	49.9
21:11	7.86	7.77	50
21:12	7.91	7.73	50
21:13	7.86	7.76	50.6
21:14	7.91	7.71	50
21:15	7.95	7.7	50.2
Average	7.6	8.1	48.3

Post Run 2 050517

Time	O2	CO2	NOX
21:21	6.49	6.07	50.2
21:22	-0.17	0.33	14.4
21:23	-0.21	0.2	0.6
21:24	-0.22	0.15	0.4
21:25	-0.23	0.13	0.3
21:26	-0.23	0.11	0.3
21:27	7.3	7.19	0.2
21:28	9.74	9.58	0.2
21:29	9.76	9.66	0.2
21:30	9.76	9.7	0.2
21:31	9.77	9.73	0.2
21:32	0.99	1.33	17.5
21:33	-0.2	0.22	44.1
21:34	-0.22	0.16	44.4
21:35	-0.23	0.13	44.5
21:36	-0.24	0.15	44.7
21:37	-0.23	0.16	44.5
21:38	-0.23	0.16	13.9
21:39	-0.23	0.16	0.8
21:40	-0.26	0.25	0.7
21:41	-0.26	0.33	0.3
21:42	0.34	0.87	0.6
21:43	-0.24	0.23	2.9
21:44	-0.24	0.12	0.5
21:45	-0.24	0.12	0.4
21:46	-0.25	0.12	0.4
21:47	-0.26	0.14	0.4

Direct Cal for 050617

Time	O2	CO2	NOX
10:18	20.76	0.05	0.1
10:19	8.05	0.27	0.3
10:20	0	0	0.1
10:21	-0.14	0	0
10:22	14.92	14.84	0.2
10:23	20.82	20.31	0
10:24	20.88	20.57	0
10:25	20.87	20.6	0
10:26	20.82	20.41	0
10:27	11.25	11.12	0.1
10:28	9.9	10.01	0
10:29	8.74	8.62	0
10:30	0.54	0.5	58.5
10:31	0.26	0.11	91.2
10:32	0.41	0.07	91.5
10:33	0.19	0.06	45.9
10:34	0.55	0.02	44.9
10:35	0.24	0.02	44.8
10:36	1.4	0.05	37.4
10:37	2.22	0	1.1
10:38	2.8	0	0.4
10:39	2.13	0	0.3
10:40	0.83	0.01	0.4
10:41	0.63	0	0.2
10:42	0.6	0	0.2
10:43	0.47	0	0.4
10:44	0.77	0	1.7
10:45	0.97	0	1.5
10:46	0.84	0.01	1.3
10:47	0.84	0	0.5
10:48	0.99	-0.01	0.3

Pre Run 3 for 050617

Time	O2	CO2	NOX
10:51	23.1	0.03	0.2
10:52	11.01	0.06	0.1
10:53	-0.42	0	0.2
10:54	-0.66	0.02	0.1
10:55	-0.18	0.17	0.1
10:56	-0.18	0.16	0.1
10:57	-0.19	0.16	0.1
10:58	-0.19	0.18	0.1
10:59	8.93	9.11	0.1
11:00	9.82	10.05	0.1
11:01	9.83	10.13	0.1
11:02	9.84	10.17	0.1
11:03	9.84	10.2	0.1
11:04	9.83	10.18	0.1
11:05	0.55	0.98	18.7
11:06	-0.14	0.33	43.7
11:07	-0.16	0.27	44
11:08	-0.17	0.24	44.1
11:09	-0.18	0.22	44.1
11:10	-0.18	0.21	44.2
11:11	-0.17	0.23	41.1
11:12	-0.19	0.2	5
11:13	-0.19	0.19	0.4
11:14	-0.19	0.19	0.3
11:15	-0.2	0.18	0.2
11:16	-0.2	0.18	0.2
11:17	-0.2	0.18	0.3
11:18	-0.2	0.17	0.4
11:19	-0.2	0.17	0.4
11:20	-0.21	0.17	0.3
11:21	-0.21	0.17	0.3
11:22	-0.21	0.17	0.3
11:23	-0.21	0.16	0.3
11:24	-0.2	0.14	0.3

Run 3 050617

Time	O2	CO2	NOX
13:20	12.53	4.97	27.1
13:21	12.37	5.05	26.5
13:22	12.65	4.93	26.6
13:23	12.79	4.86	26
13:24	13.51	4.54	24.8
13:25	13.61	4.51	22
13:26	13.4	4.61	20.8
13:27	13.16	4.72	20.2
13:28	13.04	4.77	19.1
13:29	12.94	4.83	17.3
13:30	13.17	4.72	16.9
13:31	13.3	4.66	16.5
13:32	13.28	4.67	16.5
13:33	13.55	4.54	16.7
13:34	13.57	4.53	16.7
13:35	13.62	4.51	16.6
13:36	13.07	4.77	16.6
13:37	11.35	5.5	21
13:38	10.96	5.72	23.4
13:39	10.96	5.76	23.2
13:40	10.99	5.73	23.3
13:41	11.01	5.7	23.3
13:42	11.13	5.64	23.7
13:43	11.06	5.7	23.4
13:44	11.02	5.72	23.7
13:45	11.16	5.66	24.2
13:46	11.13	5.63	23.8
13:47	11.1	5.67	23.5
13:48	11.14	5.64	23.8
13:49	11.14	5.64	23.4
13:50	11.48	5.45	23.7
13:51	11.84	5.3	22.6
13:52	11.26	5.63	23.2
13:53	10.68	6.04	24.6
13:54	11	5.71	24.5
13:55	11.08	5.68	23.9
13:56	10.86	5.85	23.8
13:57	11.27	5.58	24.3
13:58	11.31	5.52	23.4
13:59	11.53	5.43	23.7
14:00	11.5	5.45	24.2
14:01	11.38	5.5	24.2
14:02	11.08	5.65	23.8
14:03	11.3	5.54	24.4
14:04	11.19	5.58	24.4
14:05	11.39	5.5	24.1
14:06	11.37	5.5	24.6
14:07	11.36	5.52	24.5
14:08	10.98	5.74	24.2
14:09	11.18	5.6	24.7
14:10	11.77	5.35	23
14:11	11.31	5.52	23.9
14:12	11.12	5.6	24.6
14:13	11.38	5.49	24.5

Run 3 050617

14:14	11.34	5.5	24.6
14:15	11.49	5.45	25.1
14:16	11.35	5.5	24.6
14:17	11.46	5.46	24.4
14:18	11.43	5.48	23.8
14:19	11.31	5.53	24.4
14:20	11.24	5.57	24.3
14:21	11.31	5.53	24.8
14:22	11.12	5.66	24.4
14:23	11.43	5.48	24.3
14:24	11.14	5.63	24.1
14:25	11.5	5.44	24.7
14:26	11.66	5.38	24
14:27	11.45	5.46	24.2
14:28	11.33	5.51	24
14:29	11.22	5.56	24.7
14:30	11.25	5.54	24.6
14:31	11.04	5.72	24.5
14:32	10.9	5.79	25.2
14:33	11.08	5.63	24.9
14:34	11.34	5.5	24.4
14:35	11.33	5.5	24.9
14:36	11.38	5.48	24.2
14:37	11.54	5.41	24.2
14:38	12	5.21	23.6
14:39	11.71	5.35	24.4
14:40	11.36	5.5	25.1
14:41	11.39	5.49	24.8
14:42	11.58	5.39	24.4
14:43	11.87	5.27	24
14:44	11.86	5.28	24.2
14:45	11.75	5.33	24.1
14:46	11.57	5.41	24.4
14:47	11.52	5.43	24.5
14:48	11.47	5.43	24.3
14:49	11.67	5.35	23.9
14:50	11.69	5.35	24.4
14:51	11.79	5.31	24.4
14:52	11.86	5.28	24
14:53	11.66	5.37	24.7
14:54	11.51	5.43	24.7
14:55	11.42	5.46	24.6
14:56	11.47	5.44	24.6
14:57	11.66	5.36	24.4
14:58	11.81	5.3	23.9
14:59	11.77	5.31	24.1
15:00	11.79	5.3	24.5
Average	11.7	5.4	23.5

Post Run 3 for 050617

Time	O2	CO2	NOX
15:10	11.65	5.35	24.1
15:11	11.47	5.43	24.8
15:12	11.52	5.28	24.8
15:13	0.58	0.55	13.3
15:14	-0.18	0.25	0.3
15:15	-0.19	0.23	0.2
15:16	-0.2	0.21	0.2
15:17	-0.2	0.21	0.1
15:18	5.54	5.99	0.1
15:19	9.79	10.12	0.1
15:20	9.81	10.19	0.1
15:21	9.81	10.26	0.1
15:22	6.19	6.57	1.5
15:23	-0.17	0.37	37.8
15:24	-0.21	0.27	44.4
15:25	-0.22	0.23	44.6
15:26	-0.22	0.21	44.5
15:27	-0.21	0.22	44.6
15:28	-0.24	0.19	10.9
15:29	-0.24	0.18	0.4
15:30	-0.24	0.17	0.3
15:31	-0.24	0.17	0.2
15:32	0.11	0.35	1
15:33	-0.24	0.17	1.2
15:34	-0.24	0.16	0.4
15:35	-0.24	0.16	0.4
15:36	-0.24	0.15	0.3
15:37	-0.24	0.15	0.3

Airgas

Airgas Specialty Gases
12722 South Wentworth Avenue
Chicago, IL 60628
(773) 785-3000 Fax: (773) 785-1928
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E03NI80E15A0138	Reference Number:	54-124499239-2
Cylinder Number:	XC033319B	Cylinder Volume:	150.9 CF
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12015	Valve Outlet:	590
Gas Code:	CO2,O2,BALN	Certification Date:	Jun 22, 2015

Expiration Date: Jun 22, 2023

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON DIOXIDE	10.00 %	10.25 %	G1	+/- 1.0% NIST Traceable	06/22/2015
OXYGEN	10.00 %	9.850 %	G1	+/- 1.0% NIST Traceable	06/22/2015
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	06120402	CC184369	19.66 % CARBON DIOXIDE/NITROGEN	+/- 0.5%	May 01, 2016
NTRM	06120204	CC195893	20.90 % OXYGEN/NITROGEN	+/- 0.4%	Dec 01, 2015

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
CO2-1 HORIBA VIA-510 V1E3H7P5	NDIR	Jun 12, 2015
O2-1 HORIBA MPA-510 3VUYL9NR	Paramagnetic	Jun 16, 2015

Triad Data Available Upon Request

Approved for Release

Airgas

Airgas Specialty Gases
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CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E03NI58E15A02X7	Reference Number:	54-124413494-1
Cylinder Number:	EB0039392	Cylinder Volume:	160.6 CF
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2014 PSIG
PGVP Number:	B12014	Valve Outlet:	590
Gas Code:	CO2,O2,BALN	Certification Date:	Jan 15, 2014

Expiration Date: Jan 15, 2022

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON DIOXIDE	21.00 %	20.61 %	G1	+/- 0.7% NIST Traceable	01/15/2014
OXYGEN	21.00 %	20.95 %	G1	+/- 0.5% NIST Traceable	01/15/2014
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	06120405	CC184974	19.66 % CARBON DIOXIDE/NITROGEN	+/- 0.5%	May 01, 2016
NTRM	09061411	CC268005	22.53 % OXYGEN/NITROGEN	+/- 0.4%	Mar 08, 2019

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
CO2-1 HORIBA VIA-510 V1E3H7P5	NDIR	Dec 15, 2013
O2-1 HORIBA MPA-510 3VUYL9NR	Paramagnetic	Jan 14, 2014

Triad Data Available Upon Request

Notes:

Approved for Release

Airgas

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Airgas Specialty Gases
12722 South Wentworth Avenue
Chicago, IL 60628
(773) 785-3000 Fax: (773) 785-1928
Airgas.com

Part Number:	E02NI99E15A0163	Reference Number:	54-124488725-1
Cylinder Number:	CC417042	Cylinder Volume:	144.3 CF
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12015	Valve Outlet:	660
Gas Code:	NO,NOX,BALN	Certification Date:	Apr 23, 2015

Expiration Date: Apr 23, 2018

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	45.00 PPM	45.82 PPM	G1	+/- 0.9% NIST Traceable	04/16/2015, 04/23/2015
NITRIC OXIDE	45.00 PPM	45.82 PPM	G1	+/- 0.9% NIST Traceable	04/16/2015, 04/23/2015
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	13061007	CC422721	99.86 PPM NITRIC OXIDE/NITROGEN	+/- 0.8%	Nov 19, 2019
PRM	12312	680179	10.01 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Oct 15, 2014
GMIS	124206889102	CC320508	4.979 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	May 04, 2015

The SRM, PRM or RGM noted above is only in reference to the GMIS used in the assay and not part of the analysis.

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nexus 470 AEP0000428	FTIR	Apr 16, 2015
Nexus 470 AEP0000428	FTIR	Apr 16, 2015

Triad Data Available Upon Request

Approved for Release

Airgas

Airgas Specialty Gases
12722 South Wentworth Avenue
Chicago, IL 60628
(773) 785-3000 Fax: (773) 785-1928
www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E02NI99E15A3576	Reference Number:	54-124385307-1
Cylinder Number:	CC220278	Cylinder Volume:	144.3 CF
Laboratory:	ASG - Chicago - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12013	Valve Outlet:	660
Gas Code:	NO,BALN	Certification Date:	Jul 26, 2013

Expiration Date: Jul 26, 2021

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	90.00 PPM	91.48 PPM	G1	+/- 1.0% NIST Traceable	07/19/2013, 07/26/2013
NITRIC OXIDE	90.00 PPM	91.48 PPM	G1	+/- 1.0% NIST Traceable	07/19/2013, 07/26/2013
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	11060559	CC332156	101.2 PPM NITRIC OXIDE/NITROGEN	+/- 0.6%	Feb 16, 2017
NO2	124206889130	CC323209	4.824 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Oct 25, 2015

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nexus 470 AEP0000428	FTIR	Jul 21, 2013
Nexus 470 AEP0000428	FTIR	Jul 21, 2013

Triad Data Available Upon Request

Notes:

Approved for Release

Airgas

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Airgas Specialty Gases
630 United Drive
Durham , NC 27713
919-544-3773 Fax: 919-544-3774
Airgas com

Part Number:	E02AI99E15A1704	Reference Number:	122-124532724-1
Cylinder Number:	CC504828	Cylinder Volume:	146.2 Cubic Feet
Laboratory:	ASG - Durham - NC	Cylinder Pressure:	2015 PSIG
PGVP Number:	B22016	Valve Outlet:	660
Gas Code:	NO2,BALA	Certification Date:	Feb 02, 2016

Expiration Date: Feb 02, 2019

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NITROGEN DIOXIDE	50.00 PPM	50.19 PPM	G1	+/- 2.1%	01/18/2016, 02/02/2016
AIR	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
GMIS	415201401	CC345255	50.06 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Jul 25, 2017
PRM	12325	APEX1099251	50.00 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Jul 26, 2014

The SRM, PRM or RGM noted above is only in reference to the GMIS used in the assay and not part of the analysis.

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
TECO NO 42CHL-63965-341	Chemiluminescence	Jan 07, 2016

Triad Data Available Upon Request

CS Williams

Approved for Release

Pitot Tube Calibration

Pitot Tube Identification Number	Probe 1704521 (Air cooled) 10ft	
Calibrated by	Initials	JC
	Date	7/5/17
	Initials	
	Date	

Run Number	"A" Side Calibration			Deviation
	ΔP_{std}	ΔP_s	$C_{p(s)}$	$C_{p(s)}$ – Average C_p
1	0.69	1.0	0.827	0.005
2	0.68	0.95	0.838	0.010
3	0.69	1.0	0.822	0.005
		Average $C_{p(s)}$ (Side A)	0.827	0.007

Run Number	"B" Side Calibration			Deviation
	ΔP_{std}	ΔP_s	$C_{p(s)}$	$C_{p(s)}$ – Average C_p
1	0.64	0.90	0.835	0.005
2	0.63	0.92	0.819	0.010
3	0.64	0.90	0.835	0.005
		Average $C_{p(s)}$ (Side B)	0.830	0.007

$$C_{p(s)} = C_{p(std)} \times \sqrt{\frac{\Delta P_{std}}{\Delta P_s}} \qquad C_{p(std)} = 0.99$$

$$\text{Average Deviation} = \sigma_{(a \text{ or } b)} = \sum_{i=1}^{3} \left(\frac{C_{p(s)} - \overline{C_{p(s)_i}}}{3} \right) \qquad \text{Must be } \leq 0.01$$

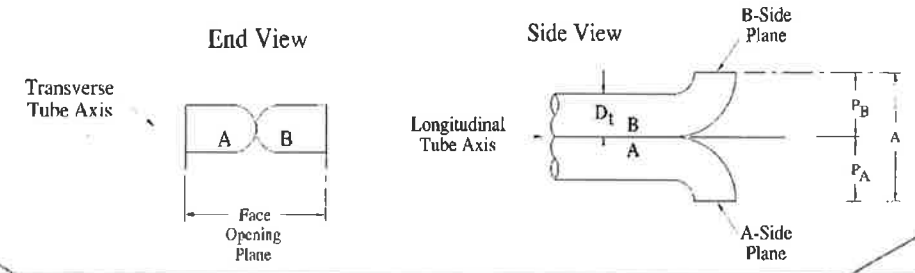
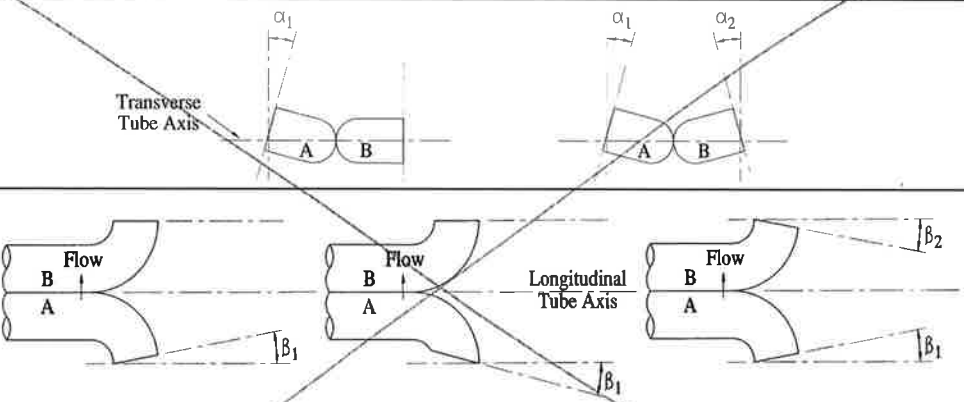
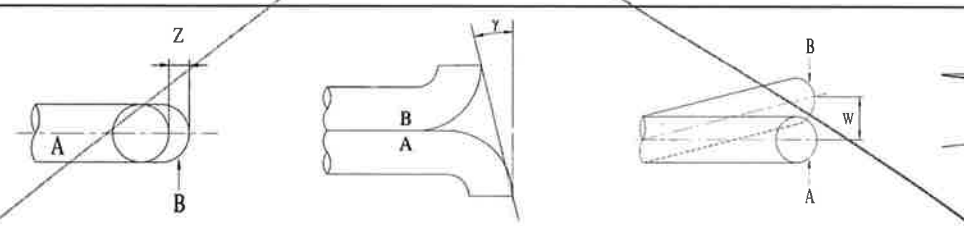
$$\text{Difference} = \left| \overline{C_{p(s)a}} - \overline{C_{p(s)b}} \right| \qquad \text{Must be } \leq 0.01$$

CDS-19; Pitot Tube in a Wind Tunnel
Per EM SOP-007
Issued: February 2017

S-Type Pitot Tube Inspection

Probe ID	1704521
Pitot ID	A7566
Caliper ID	NA
Caliper Calibration Expiration Date	NA

Calibrated by	Initials	JC
	Date	7/5/17
	Initials	
	Date	

General Pitot Tube Alignment			A = _____ " D_t = _____ " 0.188" ≤ D_t ≤ 0.375"? _____ (y/n) $1.05 \le A/2D_t \le 1.50$? _____ (y/n)
Misalignment			α_1 = _____ ° α_2 = _____ ° $\alpha_1 \le 10°$? _____ (y/n) $\alpha_2 \le 10°$? _____ (y/n) β_1 = _____ β_2 = _____ $\beta_1 \le 5°$? _____ (y/n) $\beta_2 \le 5°$? _____ (y/n)
		γ = _____ ° θ = _____ °	Z = A tan(γ) = _____ W = A tan(θ) = _____	Z ≤ 0.125"? _____ (y/n) W ≤ 0.031"? _____ (y/n)
Acceptability for Use (Circle Selection)	If all answers are "Y", this pitot tube is available for use, and may be assigned a correction factor of 0.84	If all answers except the first (D_t) are "Y", this pitot tube is available for use, but needs to be calibrated using a wind tunnel.	Any other situation, the pitot tube must be removed from service.	

Stack Thermocouple Calibration [1]

Thermometer (or Readout/TC)	ID	Mercury glass - 2490
	Calibration ~~Expiration~~ Date	May 22, 2017
Temperature Readout	ID	URS-001
	Calibration ~~Expiration~~ Date	12/22/16

Calibrated by	Initials	JC
	Date	7/5/17
	Initials	
	Date	

Reference Thermometer	Thermocouple Readout	Compare readings	Calculate applicability range for thermocouple	
T_F 84 °F $T_{abs,RT}$ 544 °R [2]	T_F 87 °F $T_{abs,TC}$ 547 °R	$\frac{T_{abs,TC}}{T_{abs,RT}}$ = 1.006 Is this between 0.985 and 1.015? Y (y/n)	$Min_{abs} = 0.9 \times T_{abs,TC}$ _____ °R	$Min_F = Min_{abs} - 460$ _____ °F
			$Max_{abs} = 1.1 \times T_{abs,TC}$ _____ °R	$Max_F = Max_{abs} - 460$ _____ °F

[1] Per SOP 032, this calibration is generally performed at 160°F.
[2] T_{abs} (°R) = T_F (°F) + 460

"A" Side Calibration

Run No.	ΔP_{std}	ΔP_s	$C_{p(s)}$	Deviation
1	0.69	1.00	0.822	0.005
2	0.68	0.95	0.838	0.010
3	0.69	1.00	0.822	0.005
Average			**0.827**	**0.007**

"B" Side Calibration

Run No.	ΔP_{std}	ΔP_s	$C_{p(s)}$	Deviation
1	0.64	0.90	0.835	0.005
2	0.63	0.92	0.819	0.010
3	0.64	0.90	0.835	0.005
Average			**0.830**	**0.007**

Average Cp(s) Difference	**0.002**
Average C_p (A+B)/2	**0.829**

Acceptance Criteria

Average Deviation (Side A) : Must be ≤ 0.01	**PASS**
Average Deviation (Side B) : Must be ≤ 0.01	**PASS**
Average $C_{p(s)}$ Difference : Must be ≤ 0.01	**PASS**

	Ref	Pitot	Acceptability
F	84	87	
R	544	547	1.006
			TRUE

	Ref	Pitot	Acceptability
C			
K	273	273	

This spreadsheet is used in conjunction with the data sheets used to inspect and calibrate pitot tubes.

These data sheets are CDS-15 and CDS-15F

Pitot Tube Calibration

Pitot Tube Identification Number	Prolze 17045 22 (Air cooled 10/1)	
Calibrated by	Initials	JC
	Date	7/5/17
	Initials	
	Date	

Run Number	"A" Side Calibration			Deviation
	ΔP_{std}	ΔP_s	$C_{p(s)}$	$C_{p(s)}$ – Average C_p
1	0.64	0.90	0.835	0.007
2	0.63	0.93	0.815	0.013
3	0.64	0.90	0.835	0.007
		Average $C_{p(s)}$ (Side A)	0.828	0.0089

Run Number	"B" Side Calibration			Deviation
	ΔP_{std}	ΔP_s	$C_{p(s)}$	$C_{p(s)}$ – Average C_p
1	0.64	0.98	0.835	0.007
2	0.63	0.90	0.828	0.0
3	0.64	0.93	0.821	0.007
		Average $C_{p(s)}$ (Side B)	0.828	0.005

$$C_{p(s)}=C_{p(std)} \times \sqrt{\frac{\Delta P_{std}}{\Delta P_s}} \qquad C_{p(std)} = 0.99$$

$$\text{Average Deviation}= \sigma_{(a \text{ or } b)}= \sum_{i=1}^{3} \left(\frac{C_{p(s)}-\overline{C_{p(s)_i}}}{3} \right) \qquad \text{Must be } \leq 0.01$$

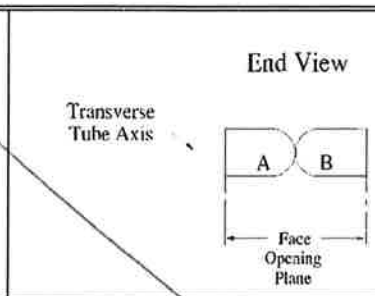
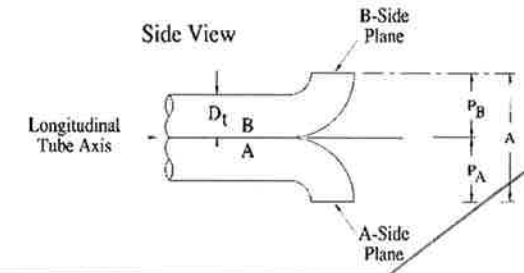
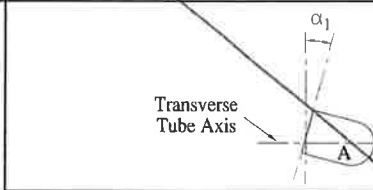
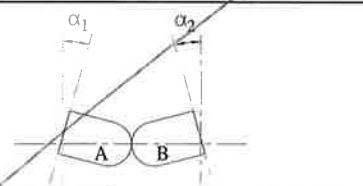
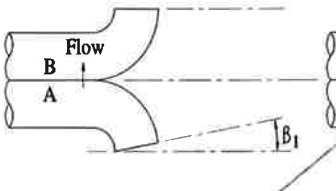
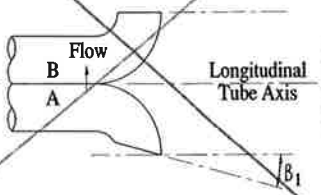
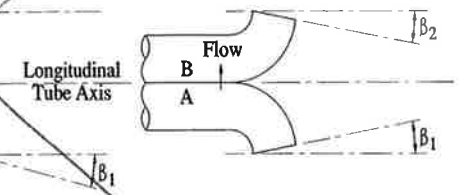
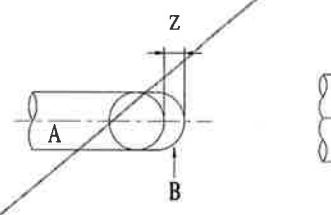
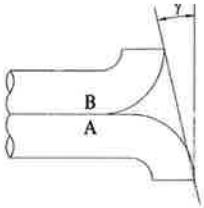
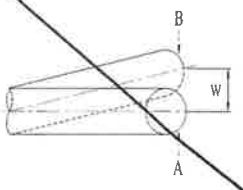
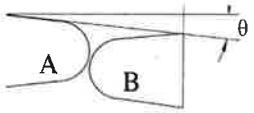
$$\text{Difference}= \left| \overline{C_{p(s)a}} - \overline{C_{p(s)b}} \right| \qquad \text{Must be } \leq 0.01$$

CDS-19; Pitot Tube in a Wind Tunnel
Per EM SOP-007
Issued: February 2017

S-Type Pitot Tube Inspection

Probe ID	1704522
Pitot ID	A7567
Caliper ID	NA
Caliper Calibration Expiration Date	NA

Calibrated by	Initials	JC
	Date	7/5/17
	Initials	
	Date	

General Pitot Tube Alignment	 	A = _____ " D_t = _____ " 0.188" ≤ D_t ≤ 0.375"? _____ (y/n) $1.05 \le A/2D_t \le 1.50$? _____ (y/n)	
Misalignment	 	α_1 = _____ ° α_2 = _____ ° $\alpha_1 \le 10°$? _____ (y/n) $\alpha_2 \le 10°$? _____ (y/n)	
	  	β_1 = _____ β_2 = _____ $\beta_1 \le 5°$? _____ (y/n) $\beta_2 \le 5°$? _____ (y/n)	
	   	γ = _____ ° θ = _____ ° Z = A tan(γ) = _____ W = A tan(θ) = _____ Z ≤ 0.125"? _____ (y/n) W ≤ 0.031"? _____ (y/n)	
Acceptability for Use (Circle Selection)	If all answers are "Y", this pitot tube is available for use, and may be assigned a correction factor of 0.84	If all answers except the first (D_t) are "Y", this pitot tube is available for use, but needs to be calibrated using a wind tunnel.	Any other situation, the pitot tube must be removed from service.

Stack Thermocouple Calibration [1]

Thermometer (or Readout/TC)	ID	Mercury glass-7490
	Calibration ~~Expiration~~ Date	May 22, 2017
Temperature Readout	ID	URS-001
	Calibration ~~Expiration~~ Date	12/22/16

Calibrated by	Initials	JC
	Date	7/5/17
	Initials	
	Date	

Reference Thermometer	Thermocouple Readout	Compare readings	Calculate applicability range for thermocouple	
T_F 84 °F $T_{abs,RT}$ 544 °R [2]	T_F 88 °F $T_{abs,TC}$ 548 °R	$\frac{T_{abs,TC}}{T_{abs,RT}}$ = 1.007 Is this between 0.985 and 1.015? Y (y/n)	$Min_{abs} = 0.9 \times T_{abs,TC}$ _____ °R	$Min_F = Min_{abs} - 460$ _____ °F
			$Max_{abs} = 1.1 \times T_{abs,TC}$ _____ °R	$Max_F = Max_{abs} - 460$ _____ °F

[1] Per SOP 032, this calibration is generally performed at 160°F.
[2] T_{abs} (°R) = T_F (°F) + 460

"A" Side Calibration

Run No.	ΔP_{std}	ΔP_s	$C_{p(s)}$	Deviation
1	0.64	0.90	0.835	0.0067
2	0.63	0.93	0.815	0.0133
3	0.64	0.90	0.835	0.0067
Average			**0.828**	**0.0089**

"B" Side Calibration

Run No.	ΔP_{std}	ΔP_s	$C_{p(s)}$	Deviation
1	0.64	0.90	0.835	0.007
2	0.63	0.90	0.828	0.000
3	0.64	0.93	0.821	0.007
Average			**0.828**	**0.005**

Average Cp(s) Difference	**0.000**
Average C_p (A+B)/2	**0.828**

Acceptance Criteria

Average Deviation (Side A) : Must be ≤ 0.01	**PASS**
Average Deviation (Side B) : Must be ≤ 0.01	**PASS**
Average $C_{p(s)}$ Difference : Must be ≤ 0.01	**PASS**

	Ref	Pitot	Acceptability
F	84	88	
R	544	548	1.007
			TRUE

	Ref	Pitot	Acceptability
C			
K	273	273	

This spreadsheet is used in conjunction with the data sheets used to inspect and calibrate pitot tubes.

These data sheets are CDS-15 and CDS-15F

5 Point Secondary Standard Dry Gas Meter Calibration

DGM ID URS-001

Calibrated by	Initials	CS
	Date	12/20/16
Reviewed by	Initials	
	Date	

Orifice ID:	IX-40			IX-48			IX-55			IX-63			IX-73		
Nominal Orifice Flow Rate (cfm or L/m)	8.64			12.58			16.56			21.18			29.12		
Orifice K':	0.2378			0.3467			0.4564			0.5840			0.8042		
Dry Gas Meter	Run 1A	Run 1B	Run 1C	Run 2A	Run 2B	Run 2C	Run 3A	Run 3B	Run 3C	Run 4A	Run 4B	Run 4C	Run 5A	Run 5B	Run 5C
Delta H	0.35	0.35		0.7	0.7		1.2	1.2		2	2		3.65	3.65	
Initial Reading, (ft^3)	163.177	168.586		218.987	224.615		157.010	174.305		202.915	210.944		181.133	192.022	
Final Reading, (ft^3)	168.586	174.305		224.615	230.215		163.177	181.133		210.944	218.987		192.022	202.915	
Difference, (ft^3)	5.409	5.719		5.628	5.600		6.167	6.828		8.029	8.043		10.889	10.893	
Initial Meter Inlet Temp., (°F)	73	72		74	73		71	73		74	74		73	74	
Initial Meter Outlet Temp., (°F)															
Final Meter Inlet Temp., (°F)	72	73		73	74		72	73		74	74		74	74	
Final Meter Outlet Temp., (°F)															
Average Meter Temp., (°F)	72.5	72.5		73.5	73.5		71.5	73.0		74.0	74.0		73.5	74.0	
Test Time (min.)	17	18		12	12		10	11		10	10		10	10	
Barometric Pressure, ("Hg)	29.66	29.66		29.66	29.66		29.66	29.66		29.66	29.66		29.66	29.66	
Ambient Temperature, (°F)	68	68		68	68		67	68		68	68		68	68	
Pump Vacuum, ("Hg)	17	17		17	17		17	17		17	17		14.5	14.5	
Standard Volume of the Meter, (V_{mstd})	5.317	5.621		5.522	5.494		6.073	6.705		7.870	7.883		10.683	10.677	
Standard Volume of Critical Orifice, (V_{crstd})	5.218	5.525		5.370	5.370		5.897	6.480		7.538	7.538		10.380	10.380	
Flow Rate (cfm or L/m)	0.313	0.312		0.460	0.458		0.607	0.610		0.787	0.788		1.068	1.068	
DGM Calibration Factor, (Y)	0.981	0.983		0.973	0.977		0.971	0.966		0.958	0.956		0.972	0.972	
Average DGM Calibration Factor (Y)	0.982			0.975			0.969			0.957			0.972		
Delta H@	2.128	2.128		2.006	2.006		1.973	1.982		2.021	2.021		1.944	1.945	
Average Delta H@	2.128			2.006			1.977			2.021			1.945		

Current Average Y =	0.971
All Individual Values within 2% of mean?	TRUE
Current Delta H@ =	2.015
All Individual Values within 0.2 of mean?	TRUE

CDS-045 DGM 5 point against orifice
Per EM SOP-002
Revision Date: May 2012

Pre/Post Test Console Calibration Check

Console ID		UKS-001
Calibrated by	Initials	WCT
	Date	5/13/17
Reviewed by	Initials	
	Date	

Orifice ID:	IX-48		IX-55		IX-63	
Orifice K':	0.3467		0.4564		0.5840	
Dry Gas Meter	Run #1a	Run #1b	Run #2a	Run #2b	Run #3a	Run #3b
Initial Reading, (ft^3)	718.980	724.563	730.162	736.322	742.495	748.813
Final Reading, (ft^3)	724.563	730.162	736.322	742.495	748.813	755.156
Difference, (ft^3)	5.583	5.599	6.160	6.173	6.318	6.343
Initial Meter Inlet Temp., (°F)	70	72	74	75	75	76
Initial Meter Outlet Temp., (°F)						
Final Meter Inlet Temp., (°F)	72	73	74	75	76	76
Final Meter Outlet Temp., (°F)						
Average Meter Temp., (°F)	71.0	72.5	74.0	75.0	75.5	76.0
Test Time (min.)	12	12	10	10	8	8
Orifice Manometer Reading, ("H_2O)	0.68	0.68	1.20	1.20	1.95	1.95
Barometric Pressure, ("Hg)	28.99	28.99	28.99	28.99	28.99	28.99
Ambient Temperature, (°F)	70	70	70	70	70	70
Pump Vacuum, ("Hg)	21	21	20	20	18	18
Standard Volume of the Meter, (Vmstd)	5.386	5.386	5.917	5.918	6.063	6.082
Standard Volume of Critical Orifice, (Vcrstd)	5.239	5.239	5.747	5.747	5.883	5.883
DGM Calibration Factor, (Y)	0.973	0.973	0.971	0.971	0.970	0.967
Difference from Average	0.002	0.002	0.000	0.000	-0.001	-0.004
Delta H@	1.94	1.93	1.97	1.97	1.96	1.95

Average Y =	0.971
Reference Yd =	0.971
Percent Difference =	0.0
Is Measured Y within 5% of Reference Yd?	TRUE
Average Delta H@ =	1.954

CDS-0453 DGM 3 point cal check against orifice
Per EM SOP-002

Temperature Readout Calibration
Isokinetic Sampling Consoles
(using a Simulated Thermometer)

Readout ID Number URS-001

Calibrated by: CS

Date 12/22/16

Reviewed by WCT

Date 12/22/16

Reference Thermometer	ID Number	2391
	Calibration Exp Date	4/4/2017
Reference Thermocouple	ID Number	SR2
	Calibration Exp Date	1/3/2017
Thermometer Simulator	ID Number	T-311348
	Calibration Exp Date	3/31/2017

Temperature Readout Calibration	
Reference Thermometer (°F)	63
Temperature Readout (°F)	62
Was Readout adjusted? Y / N	
Do these agree within 2°F Y / N	

Temperature Readout Linearity Check

Channel	Temperature (°F)			Channel	Temperature (°F)		
	Theoretical	Observed	Difference [1]		Theoretical	Observed	Difference
1 STACK	0	2	+2	4 EXIT	-25	-22	+3
	50	50	0		0	2	+2
	100	100	0		50	50	0
	250	252	+2		100	100	0
	350	351	+1		150	149	-1
	500	499	-1	5 AUX	-25	-22	+3
	750	751	+1		0	2	+2
	1000	1001	+1		50	50	0
	1500	1499	-1		100	100	0
	1900	1899	-1		150	149	-1
2 PROBE	0	2	+2	6	-25		
	50	50	0		0		
	100	100	0		50		
	250	252	+2		100		
	350	351	+1		150		
3 FILTER	0	2	+2	7	-25		
	50	50	0		0		
	100	100	0		50		
	250	252	+2		100		
	350	351	+1		150		

Acceptable difference is ±5 °F for temperatures below 1000 °F and ±10 °F for temperatures above 1000 °F Are these met? Y / N.

[1] Difference is calculated as follows: **DIfference = Observed - Theoretical**

5 Point Secondary Standard Dry Gas Meter Calibration

DGM ID URS 005

Calibrated by	JRE 12/23/15
Reviewed by	

Orifice ID:	IX-40	IX-48	IX-55	IX-63	IX-73
Nominal Orifice Flow Rate (cfm or L/m)	8.64	12.58	16.56	21.18	29.12
Orifice K':	0.2378	0.3467	0.4564	0.5840	0.8042
Dry Gas Meter	Run 1	Run 2	Run 3	Run 4	Run 5
Delta H	0.32	0.67	1.1	1.8	3.4
Initial Reading, (ft^3)	865.270	868.699	873.302	879.503	887.405
Final Reading, (ft^3)	868.431	873.217	879.381	887.268	898.005
Difference, (ft^3)	3.161	4.518	6.079	7.765	10.600
Initial Meter Inlet Temp., (°F)	61	63	64	65	66
Initial Meter Outlet Temp., (°F)	63	64	65	66	67
Final Meter Inlet Temp., (°F)	61	63	64	65	66
Final Meter Outlet Temp., (°F)	63	64	65	66	67
Average Meter Temp., (°F)	62.0	63.5	64.5	65.5	66.5
Test Time (min.)	10	10	10	10	10
Barometric Pressure, ("Hg)	29.00	29.00	29.00	29.00	29.00
Ambient Temperature, (°F)	64	64	65	65	66
Pump Vacuum, ("Hg)	15	15	15	15	15
Standard Volume of the Meter, (V_{mstd})	3.099	4.417	5.931	7.562	10.303
Standard Volume of Critical Orifice, (V_{crstd})	3.013	4.392	5.776	7.391	10.169
Flow Rate (cfm or L/m)	0.310	0.442	0.593	0.756	1.030
DGM Calibration Factor, (Y)	0.972	0.994	0.974	0.977	0.987
Average DGM Calibration Factor (Y)	0.972	0.994	0.974	0.977	0.987
Delta H@	2.025	2.000	1.902	1.904	1.904
Average Delta H@	2.025	2.000	1.902	1.904	1.904

Current Average Y =	0.981
All Individual Values within 2% of mean?	TRUE
Current Delta H@ =	1.947
All Individual Values within 0.2 of mean?	TRUE

CDS-045 DGM 5 point against orifice
Per EM SOP-002
Revision Date: May 2012

Pre/Post Test Console Calibration Check

Console ID		URS-005
Calibrated by	Initials	WCT
	Date	5/13/17
Reviewed by	Initials	
	Date	

Orifice ID:	IX-48		IX-55		IX-63	
Orifice K':	0.3467		0.4564		0.5840	
Dry Gas Meter	Run #1a	Run #1b	Run #2a	Run #2b	Run #3a	Run #3b
Initial Reading, (ft^3)	83.310	88.835	94.375	100.460	106.545	112.777
Final Reading, (ft^3)	88.835	94.375	100.460	106.545	112.777	119.024
Difference, (ft^3)	5.525	5.540	6.085	6.085	6.232	6.247
Initial Meter Inlet Temp., (°F)	66	67	69	70	72	73
Initial Meter Outlet Temp., (°F)						
Final Meter Inlet Temp., (°F)	67	68	70	72	73	74
Final Meter Outlet Temp., (°F)						
Average Meter Temp., (°F)	66.5	67.5	69.5	71.0	72.5	73.5
Test Time (min.)	12	12	10	10	8	8
Orifice Manometer Reading, ("H_2O)	0.58	0.58	1.05	1.05	1.80	1.80
Barometric Pressure, ("Hg)	28.99	28.99	28.99	28.99	28.99	28.99
Ambient Temperature, (°F)	70	70	70	70	70	70
Pump Vacuum, ("Hg)	20	20	20	20	20	20
Standard Volume of the Meter, (Vmstd)	5.374	5.379	5.892	5.876	6.012	6.015
Standard Volume of Critical Orifice, (Vcrstd)	5.239	5.239	5.747	5.747	5.883	5.883
DGM Calibration Factor, (Y)	0.975	0.974	0.975	0.978	0.979	0.978
Difference from Average	-0.002	-0.002	-0.001	0.002	0.002	0.002
Delta H@	1.67	1.66	1.74	1.73	1.82	1.81

Average Y =	0.976
Reference Yd =	0.981
Percent Difference =	-0.5
Is Measured Y within 5% of Reference Yd?	TRUE
Average Delta H@ =	1.738

CDS-0451 DGM 3 point cal check against orifice
Per EM SOP-002
Revision Date: May 2012

Temperature Readout Calibration
Isokinetic Sampling Consoles
(using a Simulated Thermometer)

Readout ID Number URS-005

Calibrated by: CS

Date 12/22/16

Reviewed by WCT

Date 12/22/16

Reference Thermometer	ID Number	2391
	Calibration Exp Date	4/4/2017
Reference Thermocouple	ID Number	SR2
	Calibration Exp Date	1/3/2017
Thermometer Simulator	ID Number	T-311348
	Calibration Exp Date	3/31/2017

Temperature Readout Calibration	
Reference Thermometer (°F)	63
Temperature Readout (°F)	62
Was Readout adjusted? Y / N	
Do these agree within 2°F Y / N	

Temperature Readout Linearity Check

Channel	Temperature (°F)			Channel	Temperature (°F)		
	Theoretical	Observed	Difference [1]		Theoretical	Observed	Difference
1 STACK	0	3	+3	4 EXIT	-25	-22	+3
	50	51	+1		0	3	+3
	100	101	+1		50	51	+1
	250	253	+3		100	101	+1
	350	353	+3		150	150	0
	500	500	0	5 AUX	-25	-22	+3
	750	752	+2		0	3	+3
	1000	1002	+2		50	51	+1
	1500	1501	+1		100	101	+1
	1900	1901	+1		150	150	0
2 PROBE	0	3	+3	6	-25		
	50	51	+1		0		
	100	101	+1		50		
	250	253	+3		100		
	350	353	+3		150		
3 FILTER	0	3	+3	7	-25		
	50	51	+1		0		
	100	101	+1		50		
	250	253	+3		100		
	350	353	+3		150		

Acceptable difference is ±5 °F for temperatures below 1000 °F and ±10 °F for temperatures above 1000 °F *Are these met?* Y / N.

[1] Difference is calculated as follows: **Difference = Observed - Theoretical**